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Transmittal

To: Chief, Permits Section
Missouri Department of Natural Resources
Hazardous Waste Program
1738 East Elm Street (Lower Level)
PO Box 176
Jefferson City, MO 65102

Date: June 28, 1999

File: 3050.005

Re: Inland Realty Co.

We are sending you:

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Quan.	Identifying Number	Title	Action*
3	May 1999	1998 Annual Ground Water Compliance Monitoring Report	I

*Action letter code:

R-reviewed
S-resubmit

N-reviewed and noted
J-rejected

I-for your information
Y-for your approval

Remarks: Enclosed is the first annual compliance monitoring report for the Inland Realty Co. property, Maryville, MO, in compliance with Missouri Hazardous Waste Management Facility Permit No. MOD099238784.

cc: Chief, RCRA Permitting & Compliance Branch,
USEPA Region VII (3 copies)
Millard Cohen - Inland Realty (1 copy)
Al Macali, Jr. - Laclede Chain Co. (1 copy)
Peter Strasner, Esq. - ThompsonCoburn (1 copy)

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

James R. Myers

James R. Myers, PE
Senior Project Engineer

O'Brien & Gere Engineers, Inc., an O'Brien & Gere Company
5000 Cedar Plaza Pkwy. / Suite 211 / St. Louis, MO 63128 / (314) 842-4550 FAX (314) 842-4551
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REPORT

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1998 Annual Ground Water Compliance Monitoring

**Inland Realty Company
Maryville, Missouri**

May 1999



O'BRIEN & GERE
ENGINEERS, INC.

REPORT

1998 Annual Ground Water Compliance Monitoring

*Inland Realty Company
Maryville, Missouri*



Dean L. Palmer, PE
Vice President

May 1999



Suite 211
5000 Cedar Plaza Parkway
St. Louis, Missouri 63128

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1. Introduction

The purpose of this report is to fulfill the reporting requirements of Missouri Hazardous Waste Management Facility Permit MOD099238784 for the Inland Realty Company site located in Maryville, Missouri. The fourth quarter 1998 ground water sampling event provides the basis for this report. Ground water samples were collected December 8-10, 1998.

1.1. Site history summary

From the early 1970s to October 1981, a surface impoundment (lagoon) owned by Nixdorff-Lloyd Chain Company received spent pickling waste from the production of low-carbon steel chains. The surface impoundment was classified by USEPA and Missouri Department of Natural Resources (MDNR) as a treatment, storage, or disposal (TSD) facility. As such, the lagoon was subject to Resource Conservation and Recovery Act (RCRA) regulation. The pickling operation was discontinued and discharges to the lagoon ceased in October 1981. In November 1984, the lagoon's liquid contents were neutralized and decanted.

The lagoon closure activities began in late 1986 to early 1987 by using lime to stabilize the sludge, placing the sludge at the west end of the former lagoon, and capping the sludge. In 1989, a Notice of Violation (NOV) prompted a decision to cap the entire former lagoon. The lagoon cap was completed in April 1990.

In December 1993, Nixdorff-Krein Industries, parent company of Nixdorff-Lloyd, received concurrent requests from USEPA and MDNR for a Part B post-closure permit application for the former lagoon, which was prepared and submitted to both agencies in May 1994. Signed approval of the post-closure permit application was received in March 1999.

1.2. Monitoring system

Thirteen wells and four piezometers form the ground water monitoring system at the Inland Realty site. The well locations and present identification are shown on Figure 1. Four wells (GMW #1 through GMW #4) were originally installed in 1982 to fulfill RCRA ground water monitoring requirements for a surface impoundment (per 40 CFR 265 Subpart F). GMW #1 was the farthest upgradient well and was located northeast of the former impoundment area. This well was located on property owned by the Missouri Department of Transportation (MODOT), and a large pile of road salt was formerly stored near the well. When the ground water indicator parameters appeared to increase, eight additional wells (GMWs 2D, 4D, 5S, 5D, 6S, 6D, 7, and 8) were installed. Because of the uncertainty of the data obtained from monitoring GMW #1, upgradient background wells GMW #5S and GMW #5D were installed as replacement wells, and GMW #1 was no longer sampled.

In March 1989, a meeting between MDNR and O'Brien & Gere Engineers, Inc. (O'Brien & Gere) resulted in a work plan to upgrade the ground water monitoring system. Improvements were made by installing two new wells (GMW #3S and GMW #3D) approximately 125 to 150 feet downgradient of the former lagoon area. Additionally, four piezometers (PZ-1 through PZ-4) were installed to monitor ground water elevations. In 1990, GMW #9 was installed to replace GMW #8 which had been damaged. GMW #1 and GMW #8 were abandoned in 1991.

The grout surface seals of several wells were formerly covered with an earthen mound. The purpose of the mound was to protect the integrity of the grout seal due to high shrinkage and swelling potential of the native soils and to promote precipitation runoff away from the wells. At the request of MDNR, these well seals were modified in 1990. The earthen mounds were removed and the concrete surface seals were brought to above the existing ground surface to replace the earthen mounds. In December 1991, additional maintenance activities were performed on the monitoring system. PSI, Inc. of Omaha, NE installed a new, reinforced concrete apron over the monitoring wells (except GMW #9).

1.3. Historical ground water sampling

During 1989, the ground water monitoring network activities were in the detection phase of closure activities. Because the results of monitoring well GMW #4 triggered a statistical increase in several analytical parameters, verified by additional ground water sampling and analyses, a ground water quality assessment plan was prepared and submitted to MDNR. Closure activities reverted to the assessment phase. Between the first quarter 1990 through the fourth quarter 1998, the ground water monitoring system has been sampled quarterly.

From 1989 through second quarter 1991, statistical analyses were performed on the laboratory analytical results and field sampling parameters. Starting with third quarter 1991, following communication with MDNR, statistical analyses were no longer performed. To replace the statistical analyses, trend graphs of key parameters and key wells were developed as part of the Annual Ground Water Report. These revisions were in the November 1991 Revised Ground Water Assessment Monitoring Plan and Sampling and Analysis Plan (SAP) which was submitted to MDNR. Revisions were based on correspondence between MDNR and O'Brien & Gere, and the requirements of the SAP were mutually agreed upon.

In addition to a modification of analytical data evaluation, three of the monitoring wells, GMW #6S, GMW #6D and GMW #7, were eliminated from quarterly sampling. The sampling frequency of these wells was decreased to annually and was scheduled to be performed during the second calendar quarter of the year. The November 1991 SAP was further revised in July 1993 and September 1997.

1.4. Historical analytical parameters

Ground water samples collected from GMW #1 through GMW #4 in 1984 were analyzed for RCRA ground water quality parameters. The analyses indicated a statistically significant increase in RCRA parameters downgradient of the former lagoon. Additional monitoring wells were installed, and analytical parameters were revised in 1985 to include pH, specific conductivity, fluoride, nitrate, chloride, dissolved metals (lead, zinc, iron, and chromium), sodium, sulfates, total organic carbon, total organic halides, and volatile halogenated organics. The analytical parameter list was expanded to include dissolved mercury in 1987 and cyanide in 1988. In February 1990, a

revised sampling plan was approved by MDNR. The 1990 sampling plan analytical parameters were cadmium, chromium, lead, mercury, nickel, zinc, cyanide, total organic carbon, sulfates, pH, and specific conductivity. The metals analyses were for both total and dissolved constituents. The sampling plan and parameter listing were revised in the Fall of 1991 at the request of MDNR. The sampling frequency of GMWs 6S, 6D, and 7 was changed to annually, and the requirement for dissolved metals analyses was discontinued. The 1991 revised analytical parameters were cadmium, chromium, lead, iron, mercury, manganese, nickel, zinc, cyanide, sulfates, pH, specific conductivity, and temperature. In 1993, the analytical method for mercury was changed to Method 7470. In 1998, the method detection limits were lowered to 2 parts per billion (ppb) for lead and to 5 ppb for cyanide.

2. Sampling and analyses

2.1. Well sampling procedure

During semi-annual sampling events, ground water monitoring well sampling procedures set forth in the Ground Water Sampling and Analysis Plan (approved in March 1999) were followed. Following is a description of these procedures.

Before the wells were purged, the water level elevations were recorded. In addition, the pH and conductivity meter was calibrated according to the manufacturer's specifications prior to sampling at each well. Using the length of the water column, the quantity of water needed to remove three well volumes was calculated. Dedicated bailers with new lengths of polypropylene rope were used to remove at least three well volumes of ground water from wells that exhibited sufficient recharge. GMW #2S and GMW #4S did not exhibit sufficient recharge to purge three well volumes. pH, specific conductivity, and temperature measurements were collected from the initial bailer of ground water and after removing each well volume. After consistent pH and specific conductivity readings were achieved, a set of ground water samples for laboratory analyses was collected, preserved with analyte-specific acids (where necessary), and cooled with ice in coolers. Ground water samples were delivered to the laboratory by overnight courier. Laboratory samples were analyzed by American Technical and Analytical Services, Inc. (ATAS) of St. Louis, Missouri. One duplicate ground water sample was analyzed by O'Brien & Gere Laboratories, Inc. of Syracuse, New York. Purge water was discharged to the Laclede Chain pretreatment system. The quantities of ground water purged from the wells are shown on the ground water sampling field logs (Appendix A). A total volume of 144 gal was purged from the monitoring wells.

2.2. Analytical results

Table 2-1 summarizes the laboratory analytical results from the December 1998 semi-annual sampling event. Laboratory analytical reports may be found in Appendix B.

Table 2-1. Ground water analytical results - December 1998 (page 1).

Parameter	Units	Monitoring Wells						Post-closure permit ground water protection standards
		2S	2D	3	3S	3D	3DA ¹	
Cadmium-Total	mg/L	<0.005	<0.005	0.019	<0.005	<0.005	<0.005	0.12
Chromium-Hexavalent	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.24
Chromium-Trivalent	mg/L	NE	NE	NE	NE	NE	NE	49
Lead-Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	3
Mercury-Total	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.37
Manganese-Total	mg/L	1.75	0.572	1.01	0.407	0.551	0.53	114
Nickel-Total	mg/L	0.008	<0.005	<0.005	0.005	<0.005	<0.005	10
Zinc-Total	mg/L	<0.010	<0.010	0.020	<0.010	0.013	0.010	1,175
Cyanide-Total	mg/L	0.015	<0.005	<0.005	0.047	<0.005	<0.005	40
pH	S.U.	7.57	6.54	6.67	6.91	6.4	6.4	N/A
Specific Conductivity	micromhos/cm	2,820	1,151	1,535	1,875	1,240	1,240	N/A
Temperature	°C	16.4	15.2	15.7	16	13.6	13.6	N/A

¹Duplicate of 3D

NE - Not estimated (See section 2.3 for explanation.)

N/A - Not applicable

Source: O'Brien & Gere Engineers, Inc.

Table 2-1. Ground water analytical results - December 1998 (page 2).

Parameter	Units	Monitoring Wells						Post-closure permit ground water protection standards
		4S	4D	5S	5D	9	10 ²	
Cadmium-Total	mg/L	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	0.12
Chromium-Hexavalent	mg/L	0.061	<0.05	<0.05	<0.05	<0.05	<0.05	0.24
Chromium-Trivalent	mg/L	NE	NE	NE	NE	NE	NE	49
Lead-Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	3
Mercury-Total	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.37
Manganese-Total	mg/L	30.3	1.22	0.259	1.11	0.701	<0.005	114
Nickel-Total	mg/L	0.431	<0.005	0.011	<0.05	<0.005	<0.005	10
Zinc-Total	mg/L	1.61	<0.010	<0.10	<0.10	0.013	<0.010	1,175
Cyanide-Total	mg/L	0.015	<0.005	<0.005	<0.005	<0.005	<0.005	40
pH	S.U.	6.22	6.32	6.53	7.19	6.69		N/A
Specific Conductivity	micromhos/ cm	4,440	1,690	3,120	1,484	1,233		N/A
Temperature	°C	12.8	12.3	14.6	13	14.3		N/A

²Sample of distilled water
NE - Not estimated (See section 2.3 for explanation.)
N/A - Not applicable
Source: O'Brien & Gere Engineers, Inc.

2.3. Comparison to post-closure permit ground water protection standards

The ground water laboratory analytical results obtained from the first semi-annual sampling event have been compared to the post-closure permit ground water protection standards (GPS). These standards were developed as part of an exposure assessment that was performed for the site and are included in the post-closure permit.

Reported cadmium concentrations ranged from less than 0.005 mg/L (GMW #s 2S, 2D, 3S, 3D, 4D, 5S, 5D, and 9) to 0.019 mg/L (GMW #3). The highest reported cadmium concentration was approximately one order of magnitude lower than the ground water protection standard of 0.12 mg/L. Reported hexavalent chromium concentrations were less than 0.05 mg/L for GMW #s 2S, 2D, 3, 3S, 3D, 4D, 5S, 5D, and 9. The detection limit for hexavalent chromium is one order of magnitude higher than that recommended in the closure permit. A review of the five SW846 methodologies for hexavalent chromium analyses and discussions with both ATAS and O'Brien & Gere Laboratories personnel indicate that a method detection limit of 0.005 mg/L is not attainable due to interferences from chlorides and sulfates in the ground water. Also, the detection limit for total chromium is 0.005 mg/L; therefore, the reported concentrations for total chromium are more accurate and will be more consistent. For these reasons, the hexavalent chromium concentration of 0.061 mg/L for GMW #4S may be inaccurate as total chromium was reported at 0.007 mg/L for GMW #4S. As total chromium is equal to hexavalent chromium plus trivalent chromium, it would be unreasonable to have a hexavalent chromium value of 0.061 mg/L as the total chromium concentration is 0.007 mg/L. If the 0.061 mg/L hexavalent chromium value for GMW #4S is accurate, it is approximately four times lower than the ground water protection standard of 0.24 mg/L.

Based on the higher method detection limit for hexavalent chromium than for total chromium, the concentration of trivalent chromium was not calculated. However, the concentrations of trivalent chromium must be less than the concentrations of total chromium, all of which are reported as at least three orders of magnitude less than the 49 mg/L trivalent chromium ground water protection standard.

Lead was not reported above the method detection limit of 0.002 mg/L, which is approximately three orders of magnitude less than the ground water protection standard of 3 mg/L. Mercury was not reported above the 0.0002

mg/L method detection limit, which is approximately three orders of magnitude less than the ground water protection standard of 0.27 mg/L. Reported manganese concentrations ranged from 0.259 mg/L to 30.3 mg/L. The highest reported manganese concentration is approximately one-fourth of the ground water protection standard of 114 mg/L. Reported nickel concentrations ranged from less than 0.005 mg/L to a high of 0.431 mg/L. The highest reported nickel concentration is 2.5 orders of magnitude less than the ground water protection standard of 10 mg/L. Reported cyanide concentrations ranged from less than 0.005 mg/L to 0.047 mg/L. The highest reported cyanide concentration is approximately two orders of magnitude less than the ground water protection standard of 40 mg/L. Reported zinc concentrations ranged from less than 0.010 mg/L to 1.61 mg/L. The highest reported zinc concentration is three orders of magnitude less than the ground water protection standard of 1,175 mg/L.

2.4. Extent of impact

The laboratory reported concentrations for cadmium, cyanide, manganese, and nickel were used to construct isoconcentration maps (Figures 2, 3, 4, and 5, respectively) for the shallow wells. Manganese concentrations were used to construct an isoconcentration map (Figure 6) for the deep wells. The remainder of the data were either all below method detection limits (lead and mercury) or only had one or two data points (chromium and zinc). The isoconcentration maps and the tabulated data indicate that, in general, the highest concentrations (while still below ground water protection standards) tend to be in an area to the east and southeast of the former lagoon approximately bounded by a line through GMWs #2S, #3S, #3D, #3, and #9. Also, concentrations tend to reduce with depth, as supported by cadmium, manganese, nickel, zinc, and cyanide concentrations from the tabulated data.

2.5. Trend graphs

To replace the statistical analyses that were previously conducted on the quarterly ground water laboratory and field results, concentration trend graphs were developed, as suggested in MDNR's September 20, 1991 letter, to illustrate the potential concentration fluctuations of key parameters and key

monitoring wells. This is the eighth ground water report to include trend graphs. Copies of the resultant graphs are shown in Appendix C (1995-1998) and Appendix D (1987-1995). The trend graphs illustrate the quarterly results of pH and total chromium, cyanide, manganese, nickel, sulfates, and zinc. Seven of the graphs illustrate the concentrations for the shallow wells - upgradient GMW #5S and downgradient wells GMW #4S and GMW #6S. The remaining seven graphs illustrate concentrations for the deep wells - upgradient GMW #5D and downgradient wells GMW #4D, GMW #6D, and GMW #9. The data assimilates first quarter 1987 through December 1998 data. Trend graphs were assembled as time (horizontal axis) versus chemical constituent concentration (vertical axis). Data which were not shown were the fourth quarter 1987 data for cyanide in which the detection limits were much higher than the rest of the results and, therefore, would skew the range of results. In addition, prior to third quarter 1991, analytical results for metals were for ground water samples that had been field-filtered and, therefore, represented dissolved metal concentrations. After third quarter 1991, dissolved metals analyses were dropped, and total metals analyses were the only metals constituents monitored.

The plotting of the trend graphs suggests that a sampling or analytical anomaly occurred for GMW #5S and GMW #5D samples for metals during second quarter 1988. These results are illustrated on the trend graph as spikes (Appendix D). This was observed in chromium and nickel concentrations in the shallow well samples and chromium, nickel, and zinc concentrations in the deep well samples.

With regard to the shallow well trend graphs, chromium, cyanide, manganese, nickel, zinc, and sulfates concentrations have generally been higher in downgradient GMW #4S than for GMW #5S (background well) and GMW #6S. The pH of GMW #4S has generally been observed lower than for GMW #5S and GMW #6S.

With respect to the deep wells, the chromium and nickel concentrations of GMW #9 have generally been higher than the chromium and nickel concentrations of GMW #5D (background well), GMW #6D, and GMW #4D. Manganese, sulfates, and zinc have generally been higher in either GMW #4D or GMW #9 than in GMW #5D and GMW #6D. The pH of the observed wells has shown the highest degree of variability. No one well is shown to be consistently higher or lower in pH values than the other wells. Cyanide has remained below detection limits since the second quarter 1991.

Trend graphs will be updated for subsequent annual ground water reports for the site by adding the ground water sample laboratory analytical data from the additional corresponding sampling events.

3. Ground water level data and calculations

3.1. Ground water elevations

Figures 7 through 14 of this report are potentiometric ground water surface elevation maps prepared from the 1998 ground water elevation data for the wells and include a table summarizing the ground water elevation measurements obtained during 1998 quarterly sampling at the wells. In general, the ground water flow directions have fluctuated little from quarter to quarter. As in the past, the observed historical direction of the ground water flow is generally in an easterly to southeasterly direction, toward the One Hundred and Two River.

A comparison of 1997 ground water elevations to 1998 ground water elevations on a quarter-to-quarter basis (*i.e.*, first quarter 1997 compared to first quarter 1998, etc.) indicates ground water elevations for 1998 were as much as 4.52 ft higher than in 1997. Ground water elevations fluctuated between 1.33 and 3.86 ft during 1998. The highest ground water elevations were during second quarter 1998. Shallow well ground water elevations were lowest in the fourth quarter (Table 3.1); deep well ground water elevations were lowest in the third quarter (Table 3.2).

1998 Annual Ground Water Compliance Monitoring

Table 3-1. Shallow well ground water elevations, 1997 and 1998

Well	First quarter		Second quarter		Third quarter		Fourth quarter	
	1997	1998	1997	1998	1997	1998	1997	1998
GMW #2S	989.41	990.30	989.04	993.56	988.83	990.89	988.90	989.70
GMW #3	990.36	991.62	990.23	993.75	990.28	991.67	989.84	991.87
GMW #3S	989.02	989.89	988.77	992.77	988.96	990.51	988.56	989.70
GMW #4S	990.26	992.43	990.67	994.62	991.10	992.28	990.39	992.16
GMW #5S	995.41	996.24	994.59	997.26	994.30	996.18	994.48	995.93
GMW #6S	985.87	986.53	985.93	988.05	986.75	987.28	986.05	986.52
PZ-1	991.95	993.34	991.22	995.54	990.96	994.70	991.16	993.14
PZ-2	992.99	994.58	992.30	995.96	992.50	994.15	992.35	994.38
PZ-3	994.58	994.67	994.17	996.25	994.95	996.12	994.41	994.93
PZ-4	993.40	993.70	993.21	996.28	993.32	994.05	993.32	993.99

Source: O'Brien & Gere Engineers, Inc.

Table 3-2. Deep well ground water elevations, 1997 and 1998

Well	First quarter		Second quarter		Third quarter		Fourth quarter	
	1997	1998	1997	1998	1997	1998	1997	1998
GMW #2D	990.18	991.52	990.04	993.35	990.02	991.54	989.65	991.62
GMW #3D	988.91	989.86	988.83	992.02	989.07	990.22	988.64	990.00
GMW #4D	990.44	991.95	990.40	993.73	990.40	991.84	989.90	992.13
GMW #5D	991.33	993.36	991.24	995.04	990.66	992.78	990.43	993.47
GMW #6D	985.87	986.53	985.93	987.98	986.73	987.16	986.05	986.53
GMW #7	986.77	988.48	986.46	989.91	987.83	987.29	987.06	987.41
GMW #9	990.20	991.63	990.13	993.43	990.19	991.56	989.68	991.85

Source: O'Brien & Gere Engineers, Inc.

3.2. Horizontal ground water migration

The ground water flow velocity has been estimated for the shallow and deep well zones using a modified Darcy's Law expression to calculate lineal velocity:

$$V = \frac{Ki}{7.48 Sy}$$

Where V = average lineal velocity, ft/day
 K = hydraulic conductivity, gpd/ft²
 i = average hydraulic gradient, ft/ft
 Sy = estimated effective porosity

Table 3-3, site hydraulic gradients, and Table 3-4, hydraulic conductivities, were used to estimate the ground water velocities for the upper silt zone and the lower sand zone. A specific yield, Sy (or effective porosity) of 0.18 was used for the silt zone and an Sy of 0.25 was used for the sand zone. The hydraulic gradient was calculated using the differences in hydraulic head between wells GMW #5S and GMW #6S with a horizontal distance between them of 1395 ft for the shallow wells. GMW #5D and GMW #6D, with a horizontal distance between them of 1395 ft, was used to calculate the hydraulic gradients for the deeper wells. A hydraulic gradient was calculated for each quarter, then those four numbers were averaged.

Table 3-3. Site hydraulic gradients (I).

Shallow wells (d = 1395 ft)				
Quarter	5S (msl elev.)	6S (msl elev.)	5S-6S	I (ft/ft)
1	996.24	986.53	9.71	0.0070
2	997.26	988.05	9.21	0.0066
3	996.18	987.28	8.90	0.0064
4	995.93	986.52	9.41	0.0067
Average gradient (I_s) = 0.0067 ft/ft				
Deep wells (d = 1395 ft)				
Quarter	5D (msl elev.)	6D (msl elev.)	5D-6D	I (ft/ft)
1	993.36	986.53	6.83	0.0049
2	995.04	987.98	7.06	0.0051
3	992.78	987.16	5.62	0.0040
4	993.47	986.53	6.94	0.0050
Average gradient (I_D) = 0.0048 ft/ft				
Source: O'Brien & Gere Engineers, Inc.				

Table 3-4. Hydraulic conductivities (K).

Shallow wells	K (gpd/ft²)	Deep wells	K (gpd/ft²)
2S	5.1	2D	9.2
3	8.16	4D	5.6
4S	1.64	5D	10.1
5S	1.95	6D	47.0
6S	14.5	7	7.4
Low K = 1.64		Low K = 5.6	
High K = 14.5		High K = 47	
Average K = 6.27		Average K = 15.86	

$$V = \frac{KI}{7.48 \text{ (Sy)}}$$

Sy for silt = 0.18.

Sy for sand = 0.25

Upper zone is generally silts.

Lower zone is generally sands and some gravel mix.

Source: O'Brien & Gere Engineers, Inc.

Hydraulic conductivities were based upon *in situ* permeability tests performed in November 1985. Table 3-4 summarizes the hydraulic conductivities for the shallow (silt zone) wells, the deeper (sand zone) wells, and the low, high, and average values for each respective zone.

Table 3-5 summarizes the calculated ground water flow velocities for the shallow zone (silt) and deeper zone (sand). The shallow zone has an approximately 50% lower flow velocity than the sand zone when comparing low to low and high to high. However, when averaged, the flow velocity within the silt zone is approximately 85% of that of the sand zone. This tends to confirm the variability in the makeup of the silt and sand and the variability of the completion depths of the monitoring wells.

Table 3-5. Ground water velocities.

	Silt zone	Sands and gravel zone
Low	2.98 ft/yr	5.28 ft/yr
High	26.3 ft/yr	44.0 ft/yr
Average	11.39 ft/yr	14.86 ft/yr
Source: O'Brien & Gere Engineers, Inc.		

3.3. Vertical ground water migration

Table 3-6 presents the 1998 ground water elevation data for the nested well pairs and the difference in elevation between shallow and corresponding deep monitoring wells.

If the ground water elevation in the deep well is higher than in the corresponding shallow well, the hydraulic head in the deep well is higher than in the shallow well. Hence, an upward flow potential exists. Conversely, if the ground water elevation in the shallow well is higher than in the corresponding deep well, the hydraulic head in the shallow well is higher than in the deep well. In this case, a downward flow potential exists.

GMW #2S/#2D had an upward flow potential during the first, third, and fourth quarters of 1998. GMW #3S/3D had a downward flow potential during the first, second, and third quarters of 1998 and an upward flow potential during the fourth quarter 1998. GMW #4S/4D and GMW #5S/5D had downward flow potentials for the four quarters of 1998. GMW #6S/6D had

no vertical flow potential for the first quarter 1998, a slight downward flow potential for the second and third quarters 1998, and a very slight upward flow potential for the fourth quarter 1998.

Table 3-6. Vertical ground water flow potential; 1998 elevation data

Shallow wells	Ground water elevation	Deep wells	Ground water elevation	Shallow -deep elevation	
2S	990.30	2D	991.52	-1.22	↑
	993.56		993.35	0.21	↓
	990.89		991.54	-0.65	↑
	989.70		991.62	-1.92	↑
3S	989.89	3D	989.86	0.03	↓
	992.77		992.02	0.75	↓
	990.51		990.22	0.29	↓
	989.70		990.00	-0.30	↑
4S	992.43	4D	991.95	0.48	↓
	994.62		993.73	0.89	↓
	992.28		991.84	0.44	↓
	992.16		992.13	0.03	↓
5S	996.24	5D	993.36	2.88	↓
	997.26		995.04	2.22	↓
	996.18		992.78	3.40	↓
	995.93		993.47	2.46	↓
6S	986.53	6D	986.53	0.00	-
	988.005		987.98	0.07	↓
	987.28		987.16	0.12	↓
	986.52		986.53	-0.01	↑

↑ ↓ - direction of apparent relative vertical flow component potential

Source: O'Brien & Gere Engineers, Inc.)

4. Conclusions

Based on the 1998 quarterly field activities, ground water elevation data, laboratory analytical results, and well inspection activities performed, the following conclusions are made:

1. Regional and site ground water flow direction is primarily in an east to southeast direction toward the One Hundred Two River.
2. Analytical results and their respective quality assurance/quality control measures did not indicate the existence of anomalies or inconsistencies that would affect the assessment of the analytical results.
3. Analytical data indicate no well had reported concentrations above the post-closure permit ground water protection standards.
4. Observations were made of the ground water monitoring wells' surface condition as part of the quarterly sampling activities. During 1998, the ground water monitoring wells' seals and integrity remained intact.
5. Reviewing existing 1998 data, reports, and corresponding field activities, it appears that the current ground water monitoring system adequately defines ground water quality and conditions surrounding the former surface impoundment.

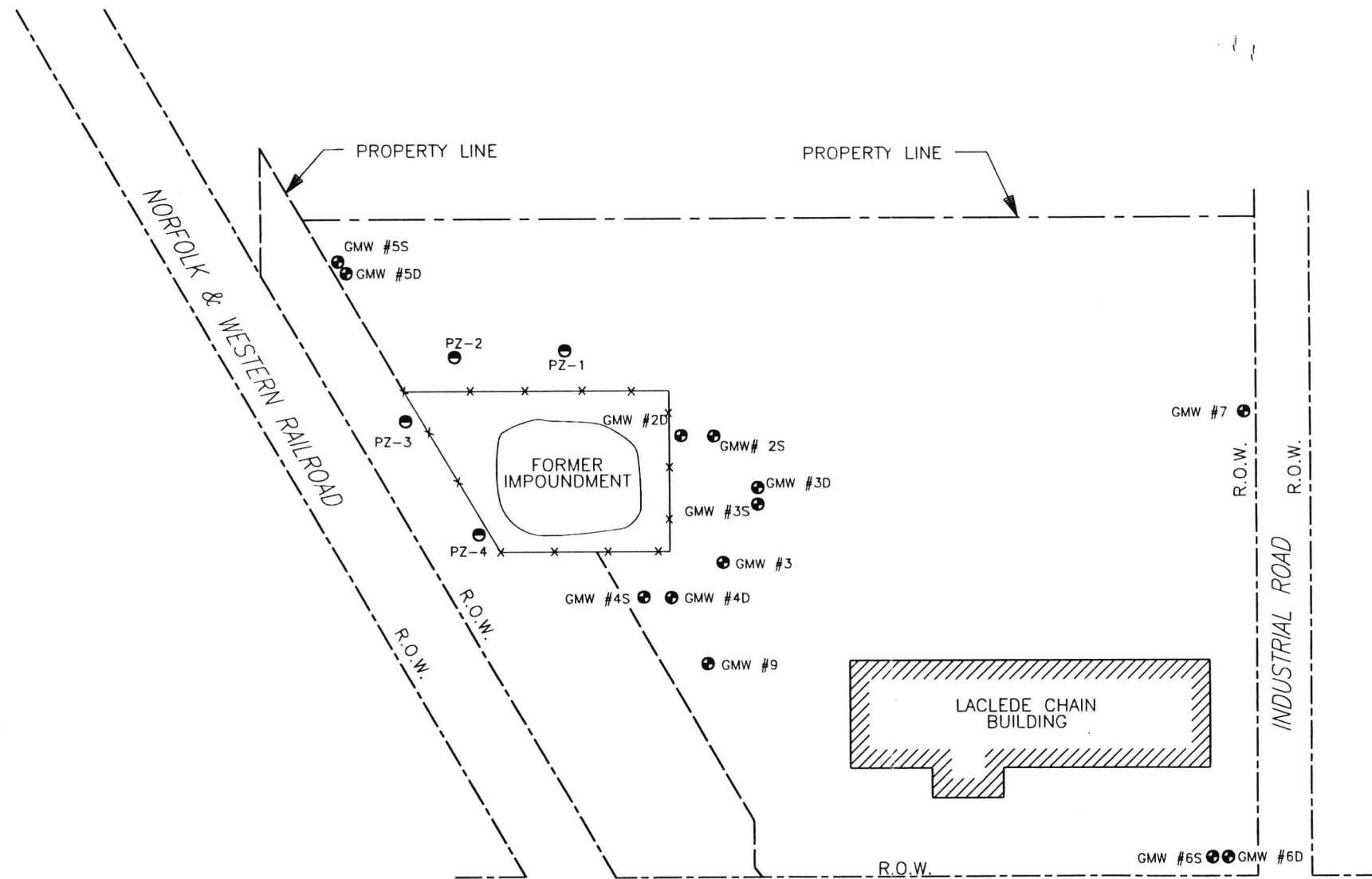


FIGURE 1

- LEGEND**
- GROUND WATER MONITORING WELL
 - ⊗ PIEZOMETER

INLAND REALTY COMPANY
MARYVILLE, MISSOURI

**GROUND WATER
MONITORING WELL
LOCATION PLAN**

DWG PATH: I:\PROJECTS\3050005\DWG\208.DWG 1=1

PLOT DATE: 4/22/99

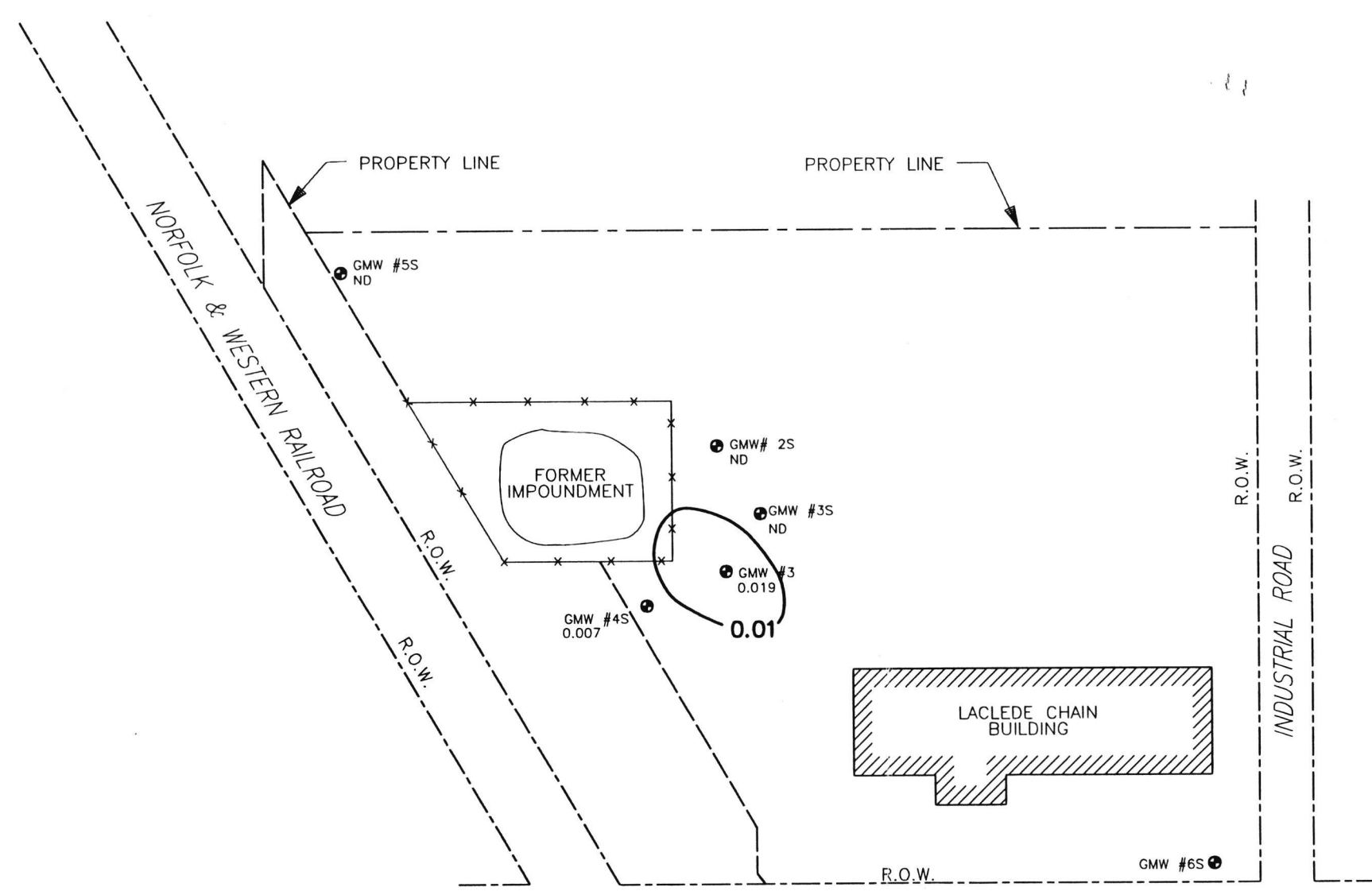


FIGURE 2



LEGEND

- GROUND WATER MONITORING WELL
- ND NONDETECT
- 0.01 REPORTED CONCENTRATION MG/L

INLAND REALTY COMPANY
MARYVILLE, MISSOURI

**CADMIUM
ISOCONCENTRATION MAP
SHALLOW WELLS**

4/22/99
3050.005.208



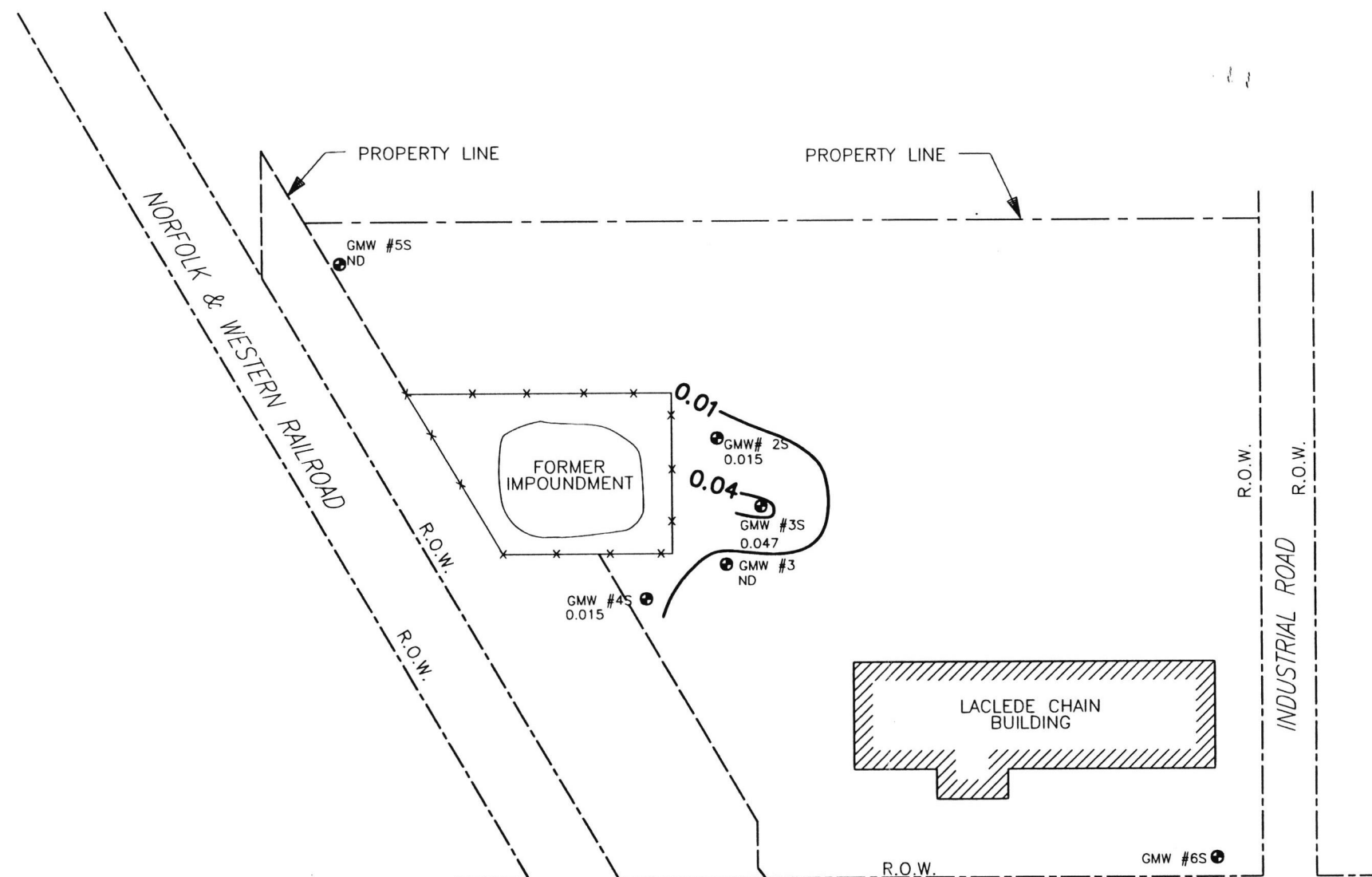


FIGURE 3



LEGEND

- GROUND WATER MONITORING WELL
- ND NONDETECT
- 0.01 REPORTED CONCENTRATION MG/L

INLAND REALTY COMPANY
MARYVILLE, MISSOURI

CYANIDE
ISOCONCENTRATION MAP
SHALLOW WELLS

4/22/99
3050.005.209

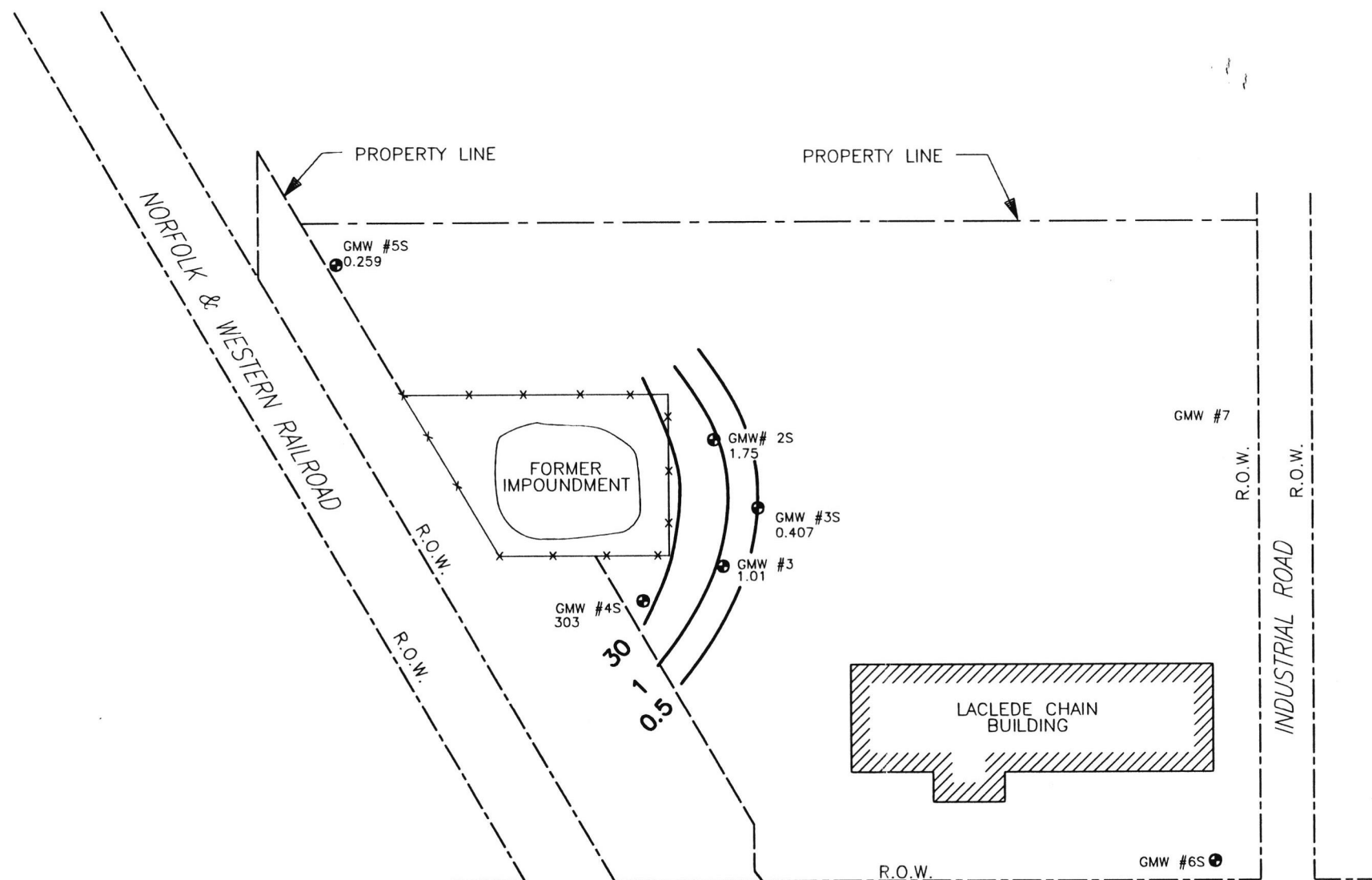


FIGURE 4



LEGEND

- GROUND WATER MONITORING WELL
- ND NONDETECT
- 0.5 — REPORTED CONCENTRATION MG/L

INLAND REALTY COMPANY
MARYVILLE, MISSOURI

**MANGANESE
ISOCONCENTRATION MAP
SHALLOW WELLS**

4/22/99
3050.005.210

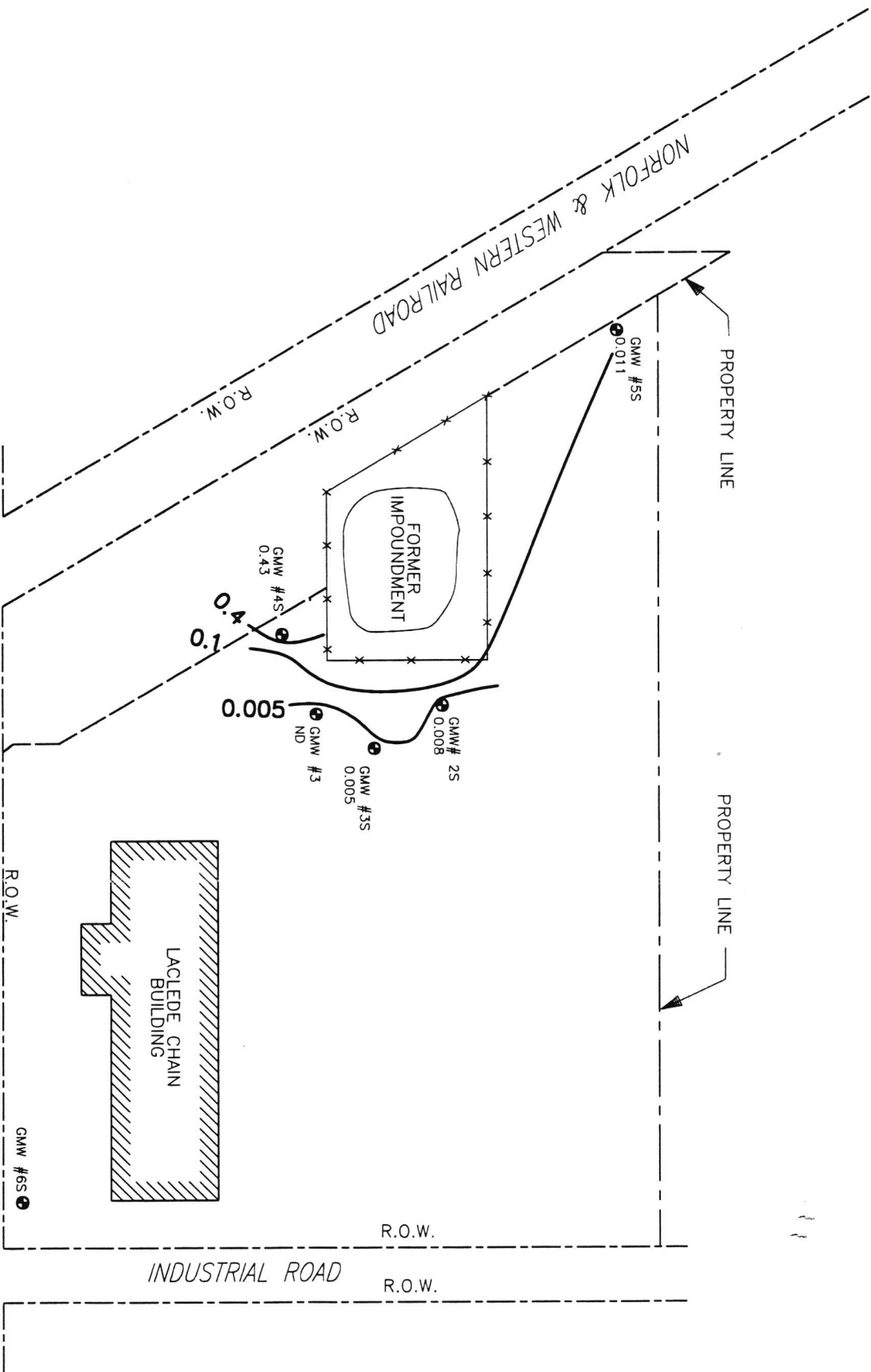


FIGURE 5



LEGEND

- GROUND WATER MONITORING WELL
- ND NONDETECT
- 0.1 — REPORTED CONCENTRATION MG/L

INLAND REALTY COMPANY
MARYVILLE, MISSOURI

NICKEL
ISOCNCONCENTRATION MAP
SHALLOW WELLS



O'BRIEN & GERE
ENGINEERS, INC.

4/22/99
3050.005.212

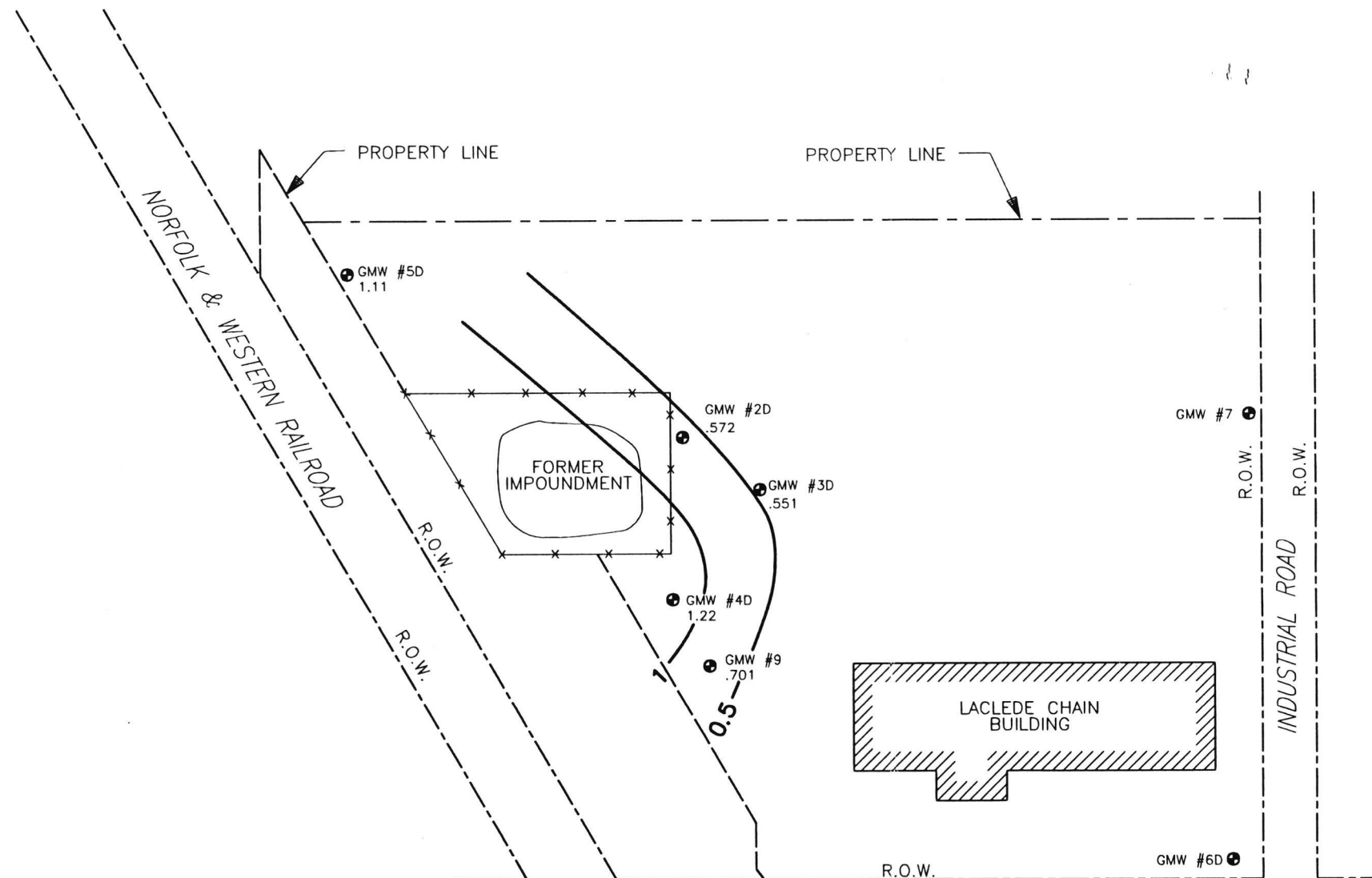


FIGURE 6

LEGEND

- GROUND WATER MONITORING WELL
- ND NONDETECT
- 0.5 — REPORTED CONCENTRATION MG/L

INLAND REALTY COMPANY
MARYVILLE, MISSOURI

MANGANESE
ISOCONCENTRATION MAP
DEEP WELLS

4/22/99
3050.005.211

WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2S	8.24	998.54	990.30
3	4.79	996.41	991.62
3S	7.78	997.67	989.89
4S	5.46	997.89	992.43
5S	7.01	1003.25	996.24
6S	5.89	992.42	986.53
P1	8.32	1001.66	993.34
P2	7.39	1001.97	994.58
P3	7.85	1002.52	994.67
P4	8.67	1002.37	993.70

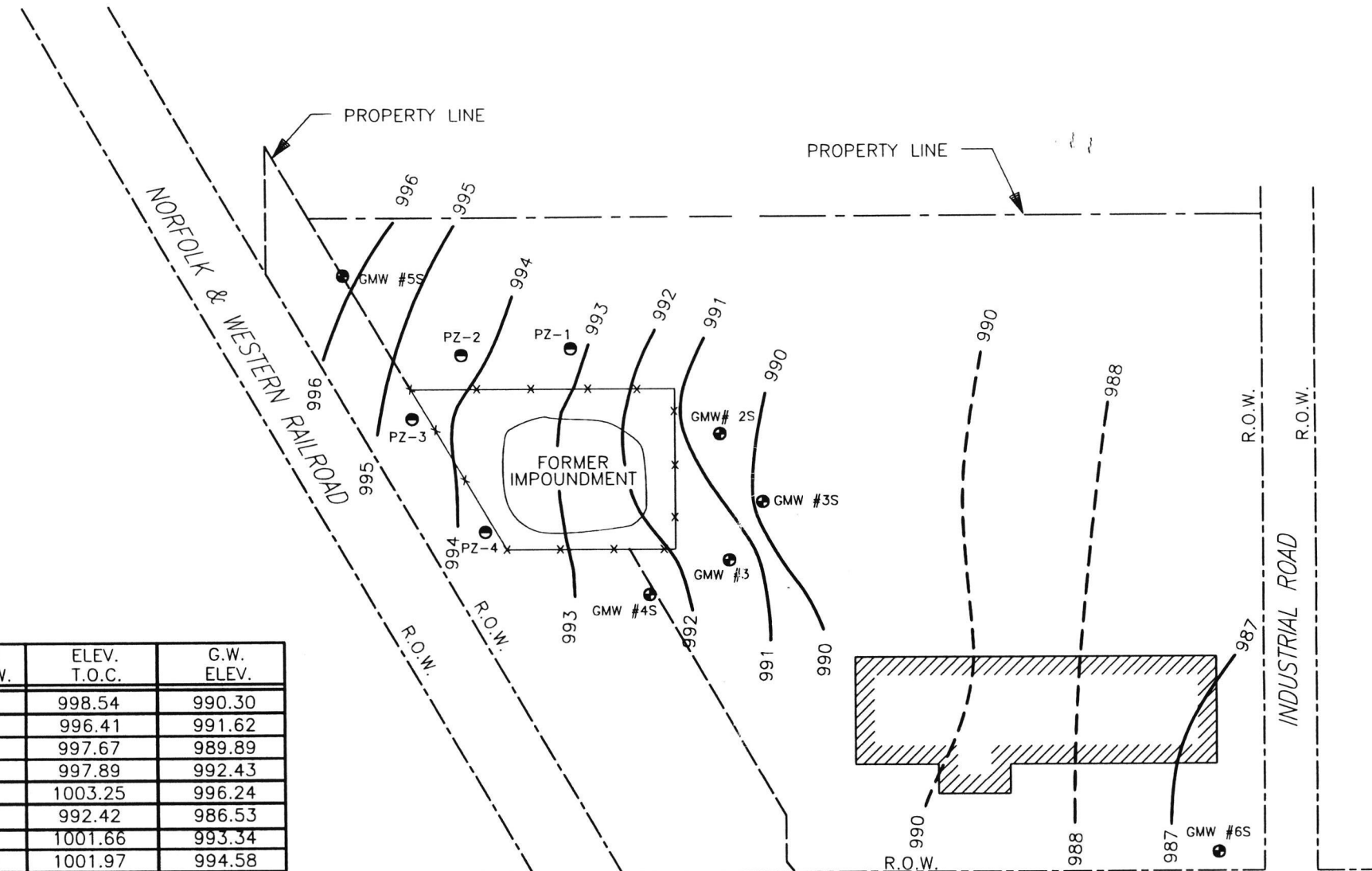


FIGURE 7



LEGEND

- 990 INFERRED GROUND WATER ELEVATION CONTOUR LINE
- GROUND WATER MONITORING WELL
- PIEZOMETER

INLAND REALTY COMPANY
MARYVILLE, MISSOURI
FIRST QUARTER 1998
SHALLOW WELLS

GROUND WATER ELEVATION CONTOUR MAP

4/22/99
3050.005-200F

WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2D	6.90	998.42	991.52
3D	7.85	997.71	989.86
4D	7.30	999.25	991.95
5D	9.89	1003.25	993.36
6D	5.94	992.47	986.53
7	6.78	994.42	988.48
9	5.71	997.34	991.63

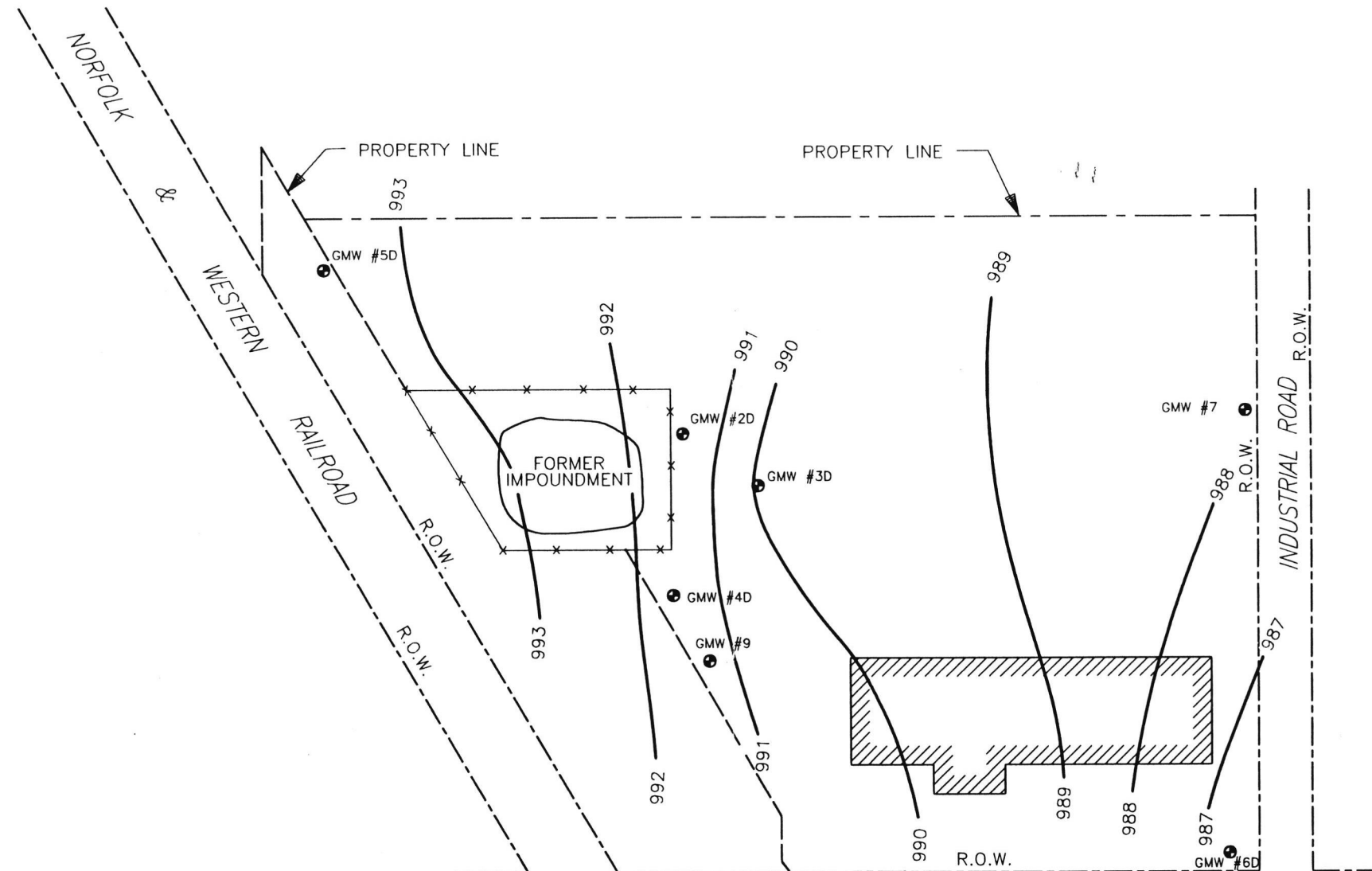


FIGURE 8



LEGEND

- 990 — INFERRED GROUND WATER ELEVATION CONTOUR LINE
- GROUND WATER MONITORING WELL

INLAND REALTY COMPANY
MARYVILLE, MISSOURI
FIRST QUARTER 1998
DEEP WELLS

**GROUND WATER ELEVATION
CONTOUR MAP**

4/22/99
3050.005-201F

WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2S	4.98	998.54	993.56
3	2.66	996.41	993.75
3S	4.90	997.67	992.77
4S	3.27	997.89	994.62
5S	5.99	1003.25	997.26
6S	4.37	992.42	988.05
P1	6.12	1001.66	995.54
P2	6.01	1001.97	995.96
P3	6.27	1002.52	996.25
P4	6.09	1002.37	996.28

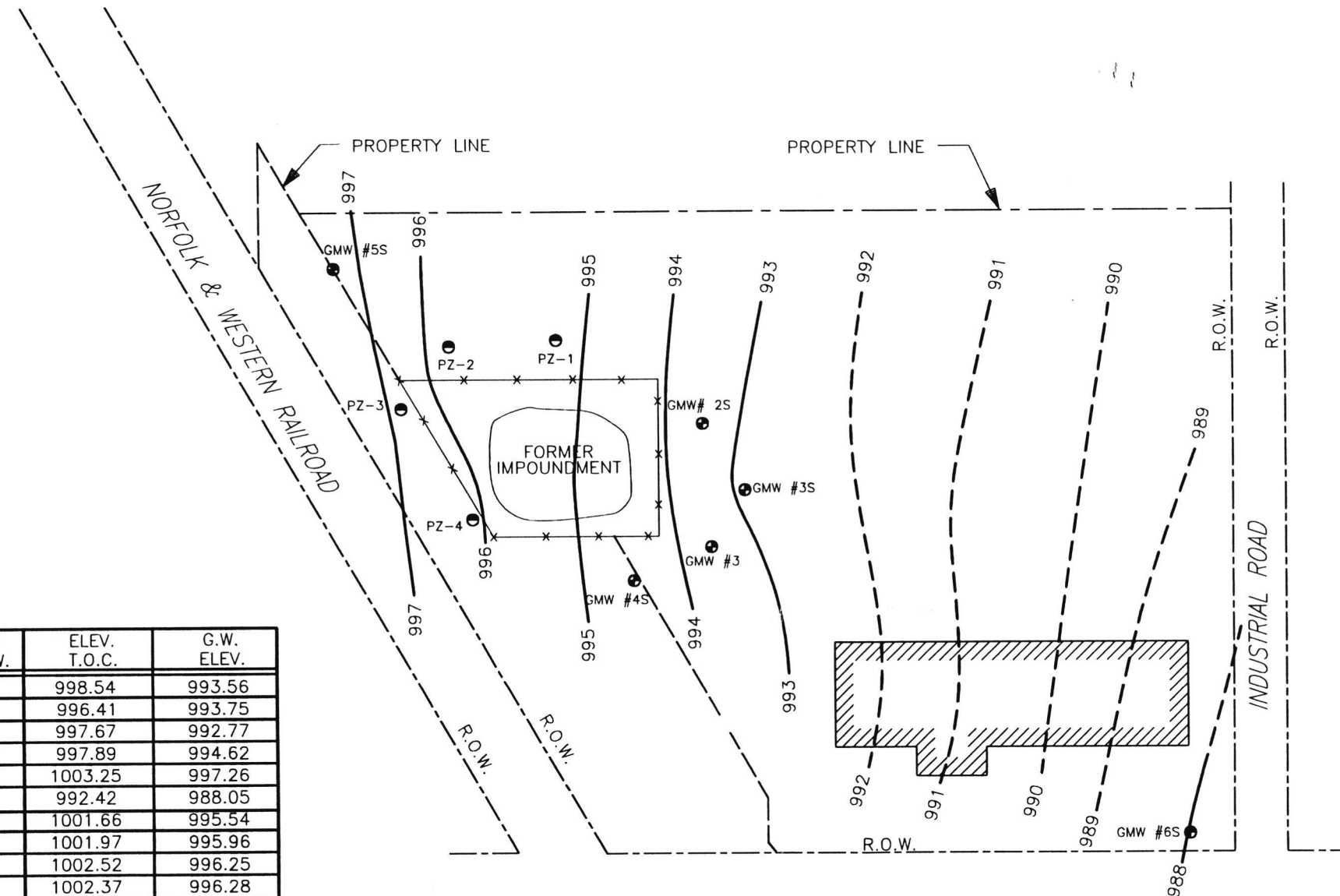


FIGURE 9



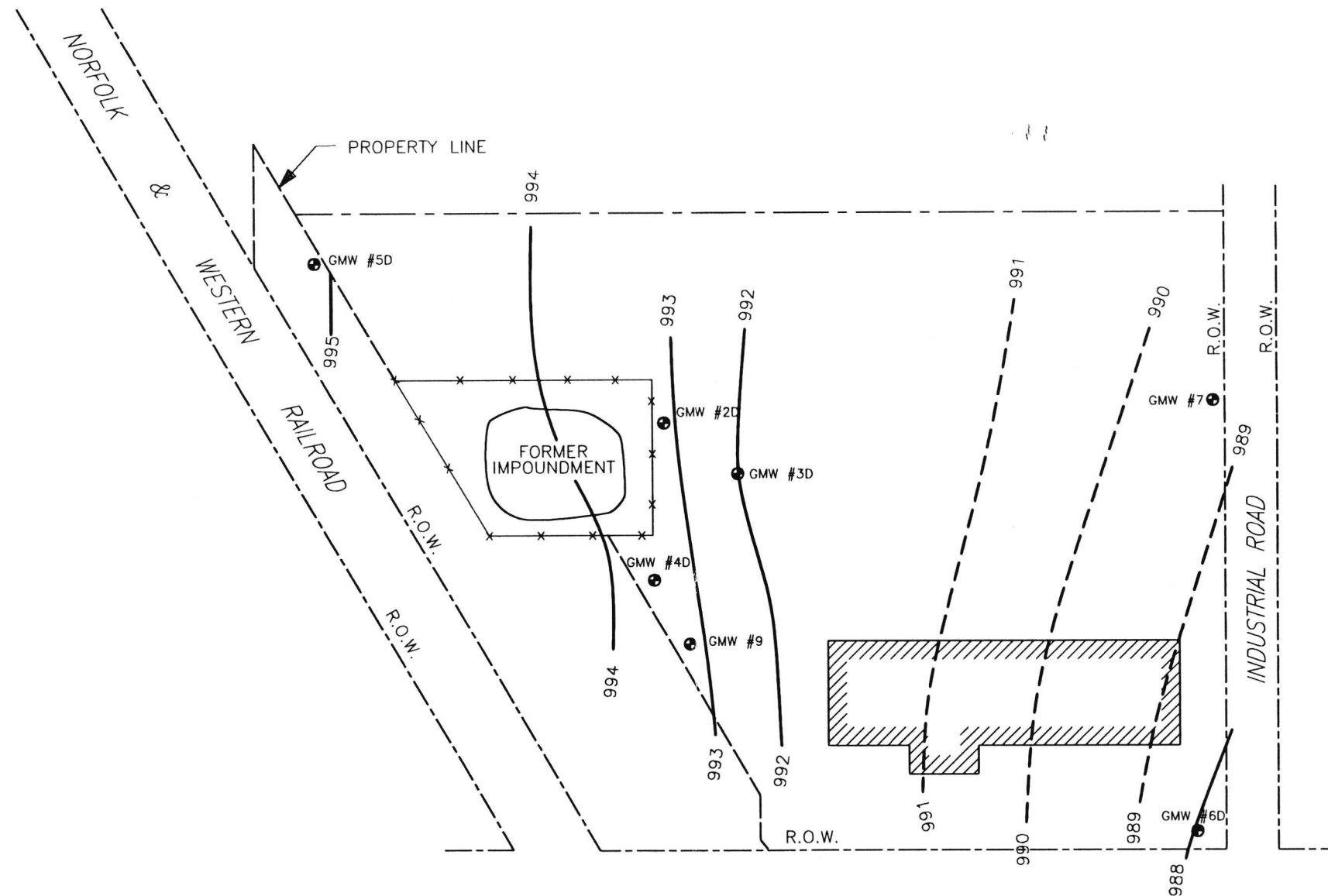
LEGEND

- 990 INFERRED GROUND WATER ELEVATION CONTOUR LINE
- GROUND WATER MONITORING WELL
- PIEZOMETER

INLAND REALTY COMPANY
MARYVILLE, MISSOURI
SECOND QUARTER 1998
SHALLOW WELLS

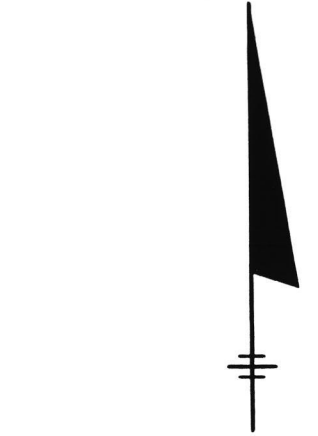
GROUND WATER ELEVATION CONTOUR MAP

1/6/98
3050.005-202F



WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2D	5.07	998.42	993.35
3D	5.69	997.71	992.02
4D	5.52	999.25	993.73
5D	8.21	1003.25	995.04
6D	4.49	992.47	987.98
7	4.51	994.42	989.91
9	3.91	997.34	993.43

FIGURE 10



LEGEND

- 990 — INFERRED GROUND WATER ELEVATION CONTOUR LINE
- GROUND WATER MONITORING WELL

INLAND REALTY COMPANY
MARYVILLE, MISSOURI
SECOND QUARTER 1998
DEEP WELLS

**GROUND WATER ELEVATION
CONTOUR MAP**

4/22/99
3050.005-203F

WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2S	7.65	998.54	990.89
3	4.74	996.41	991.67
3S	7.16	997.67	990.51
4S	5.61	997.89	992.28
5S	7.07	1003.25	996.18
6S	5.14	992.42	987.28
P1	6.96	1001.66	994.70
P2	7.82	1001.97	994.15
P3	6.40	1002.52	996.12
P4	8.32	1002.37	994.05

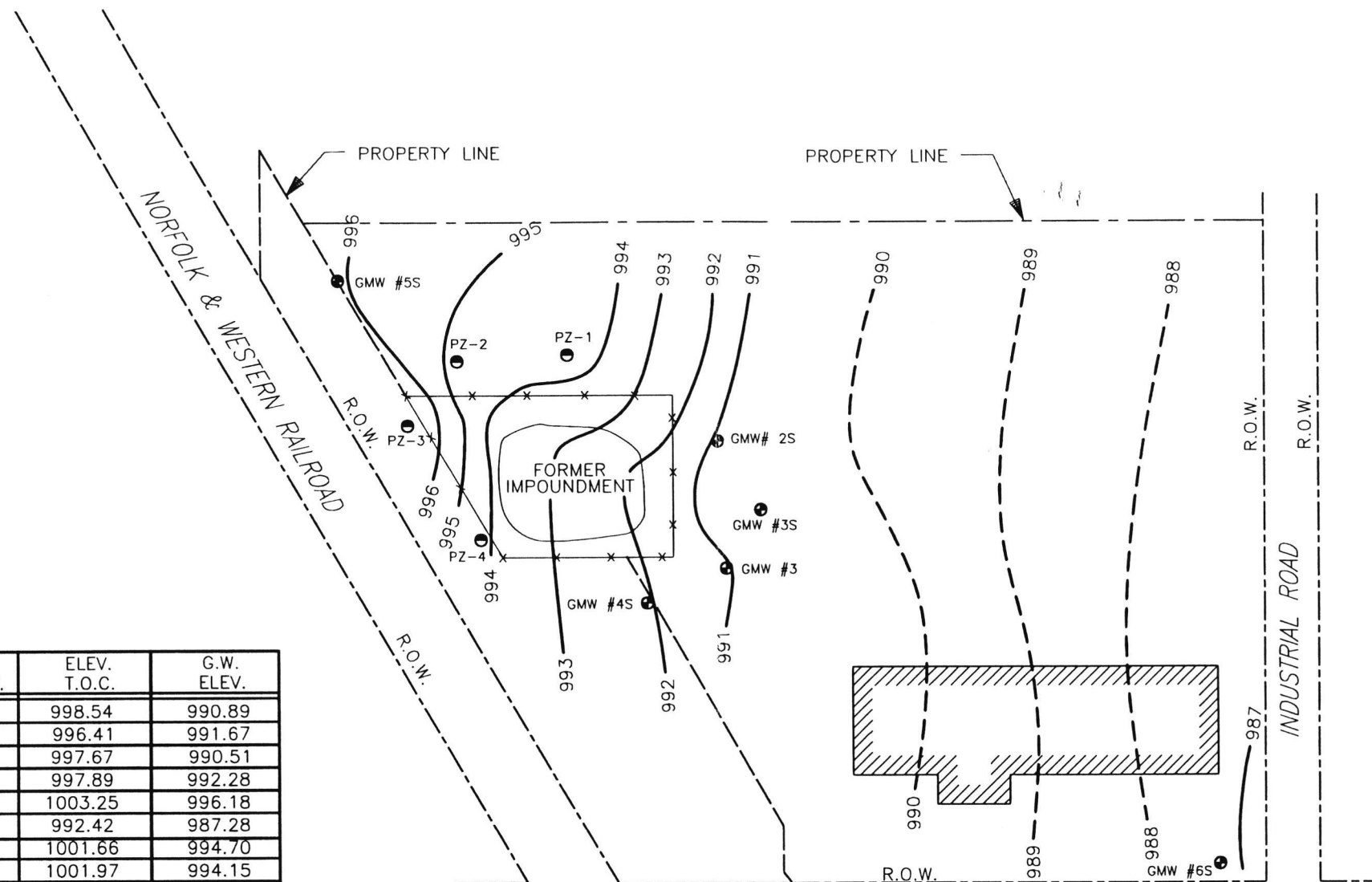


FIGURE 11



LEGEND

- 990 INFERRED GROUND WATER ELEVATION CONTOUR LINE
- GROUND WATER MONITORING WELL
- PIEZOMETER

INLAND REALTY COMPANY
MARYVILLE, MISSOURI
THIRD QUARTER 1998
SHALLOW WELLS

GROUND WATER ELEVATION CONTOUR MAP

4/22/99
3050.005-204F

WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2D	6.88	998.42	991.54
3D	7.49	997.71	990.22
4D	7.41	999.25	991.84
5D	10.47	1003.25	992.78
6D	5.31	992.47	987.16
7	7.13	994.42	987.29
9	5.78	997.34	991.56

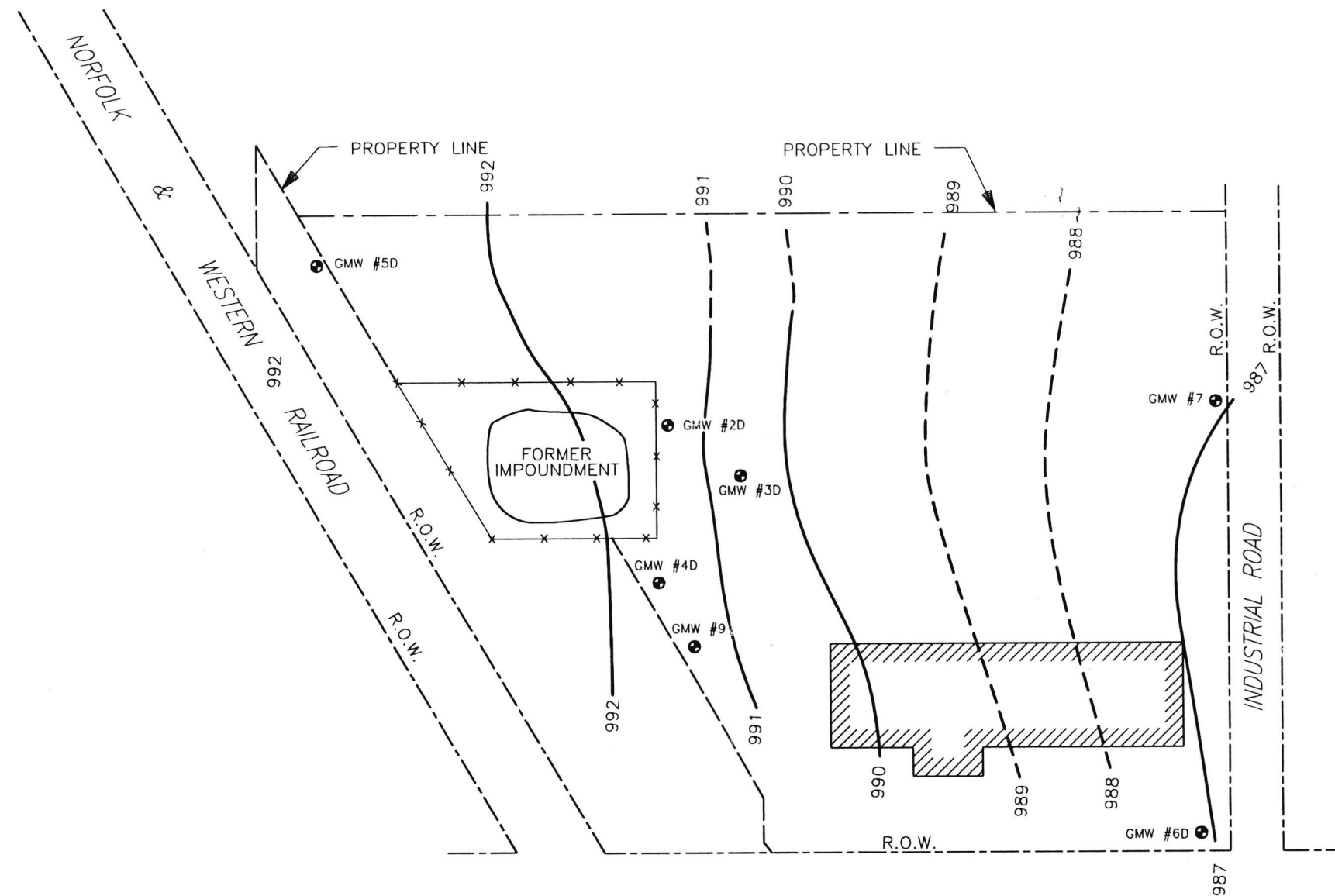


FIGURE 12

LEGEND

990- INFERRED GROUND WATER ELEVATION CONTOUR LINE

• GROUND WATER MONITORING WELL

INLAND REALTY COMPANY
MARYVILLE, MISSOURI
THIRD QUARTER 1998
DEEP WELLS

GROUND WATER ELEVATION
CONTOUR MAP

WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2S	8.84	998.54	989.70
3	4.54	996.41	991.87
3S	7.97	997.67	989.70
4S	5.73	997.89	992.16
5S	7.32	1003.25	995.93
6S	5.90	992.42	986.52
P1	8.52	1001.66	993.14
P2	7.59	1001.97	994.38
P3	7.59	1002.52	994.93
P4	8.38	1002.37	993.99

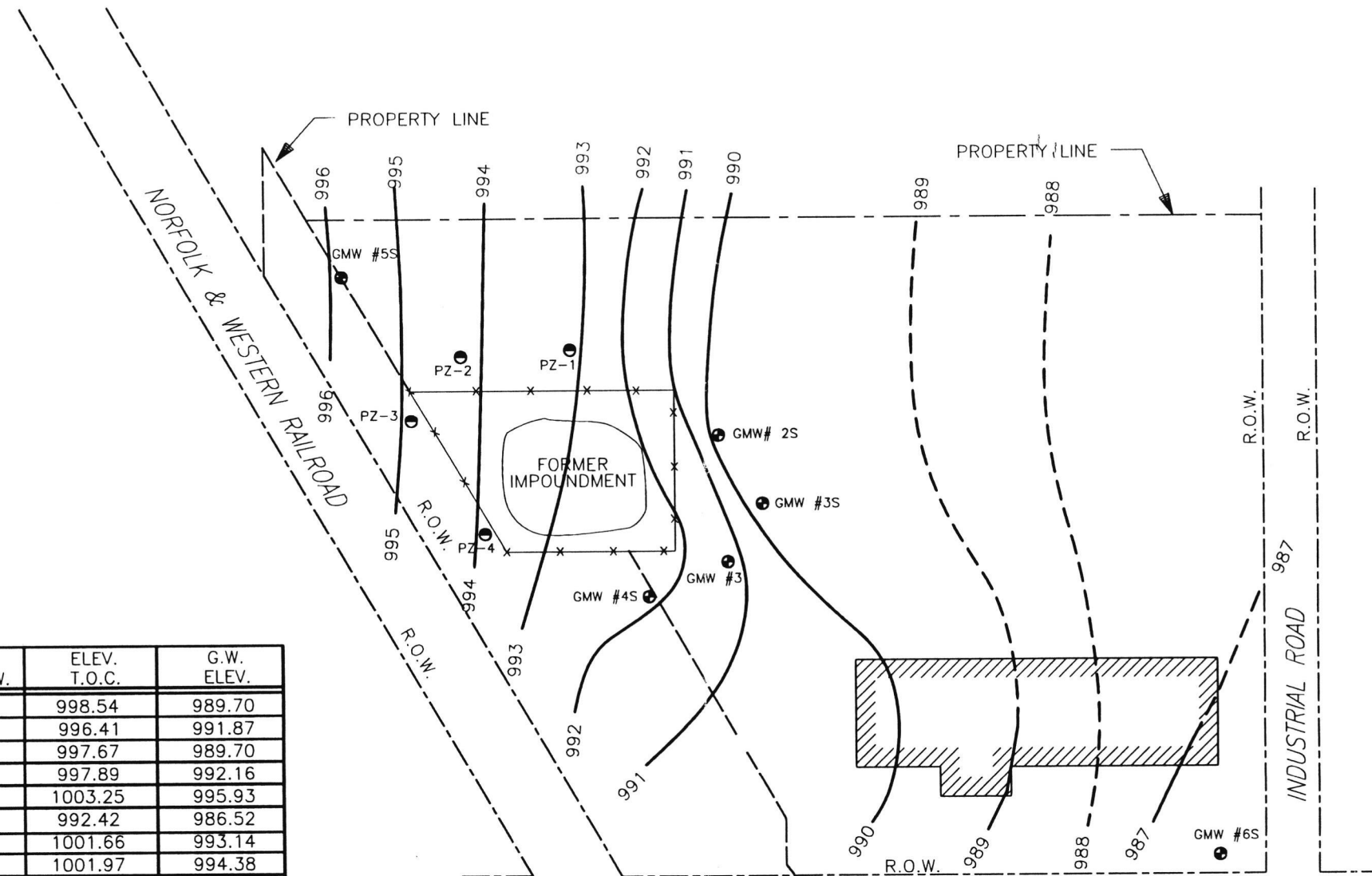


FIGURE 13



LEGEND

- 990 — INFERRED GROUND WATER ELEVATION CONTOUR LINE
- GROUND WATER MONITORING WELL
- PIEZOMETER

INLAND REALTY COMPANY
MARYVILLE, MISSOURI
FOURTH QUARTER 1998
SHALLOW WELLS

GROUND WATER ELEVATION CONTOUR MAP

4/22/99
3050.005-206F

WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2D	6.80	998.42	991.62
3D	7.71	997.71	990.00
4D	7.12	999.25	992.13
5D	9.78	1003.25	993.47
6D	5.94	992.47	986.53
7	7.01	994.42	987.41
9	5.49	997.34	991.85

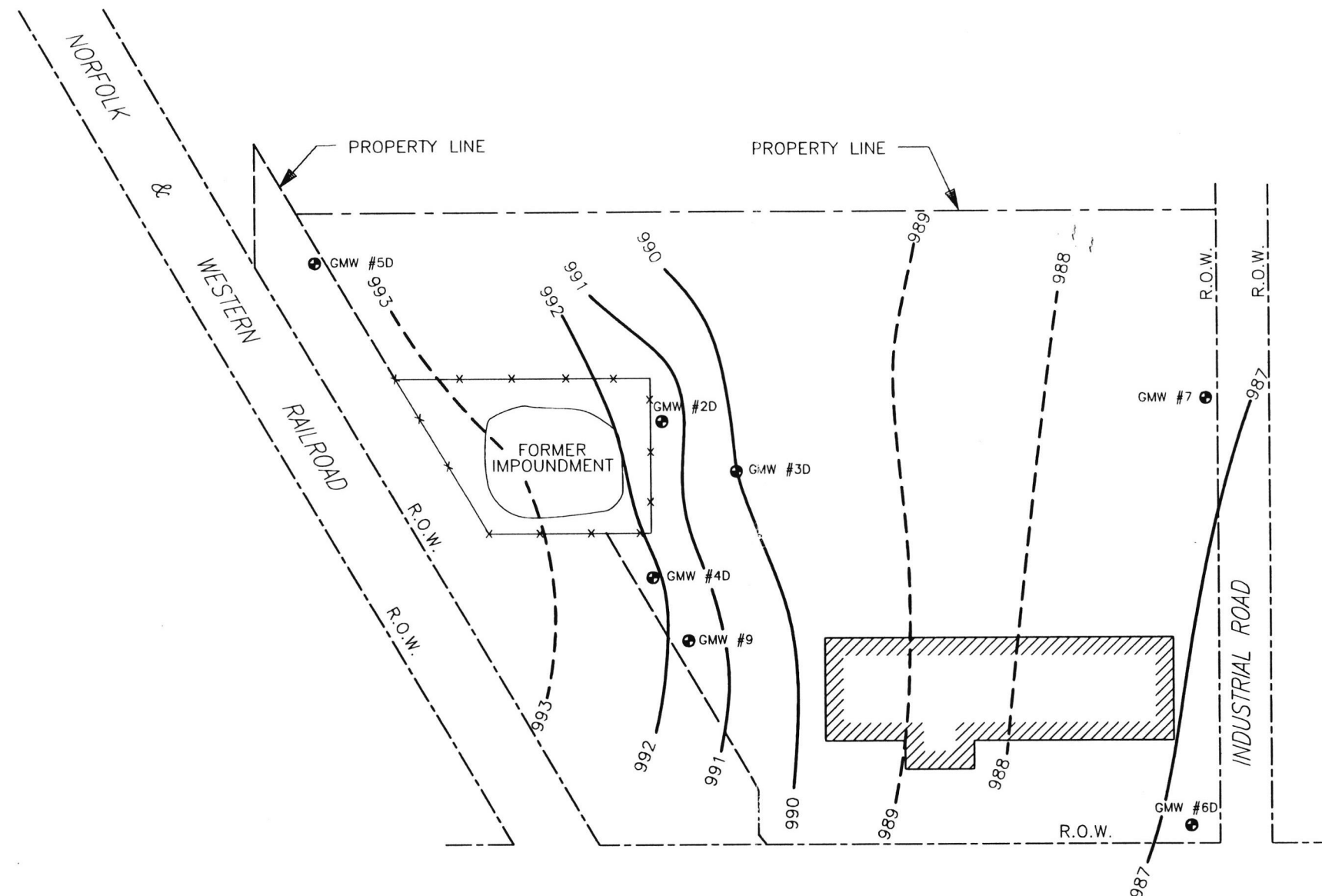


FIGURE 14

LEGEND

990 — INFERRED GROUND WATER ELEVATION CONTOUR LINE

• GROUND WATER MONITORING WELL

INLAND REALTY COMPANY
MARYVILLE, MISSOURI
FOURTH QUARTER 1998
DEEP WELLS

GROUND WATER ELEVATION
CONTOUR MAP

Ground water sampling field logs

Date: 12/9/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: clear 40°F
 Well Number: GMW#2S
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 21.75 ft.
 Depth to Water * 8.84 ft.
 Length of Water Column 12.91 ft.
 Volume of Water in Well 8.4 gal.(s)
 3X Volume of Water in Well 25.2 gal.(s)

Water Volume /ft. for:

2" Diameter Well = 0.163 X LWC

4" Diameter Well = 0.653 X LWC

6" Diameter Well = 1.469 X LWC

Volume removed before sampling 15 gal.(s)
 Did well go dry? Yes ✓ No

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify)

Water parameters:

Temperature Reading

initial 62.9
 after 8 (gal.) 60.8
 after 15 (gal.) 61.6
 after 25 (gal.)
 after (gal.)
 after (gal.)

pH Reading

4.0 Standard 4.01
 7.0 Standard 7.03
 10.0 Standard NA
 initial 7.14
 after 8 (gal.) 7.19
 after 15 (gal.) 7.57
 after 25 (gal.)
 after (gal.)
 after (gal.)

Conductivity Reading

84 S Standard NA
 1413 S Standard 1414
 initial 1777
 after 8 (gal.) 2820
 after 15 (gal.) 2820
 after 25 (gal.)
 after (gal.)
 after (gal.)

Water Sample: 104D
 Time Collected:

Physical Appearance at Start

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Physical Appearance at Sampling

Color light reddish brown
 Odor dirty
 Turbidity (> 100 NTU's) >100
 Sheen/Free Product no

Sample Parameters: Metals (Cd, Cr, Cr VI, Fe, Hg, Mn, Ni, Pb, Zn), Sulfates, Cyanide

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO3</u>	<u>2.2</u>	<u>40°C</u>	
<u>1000 ml</u>	<u>Poly</u>	<u>1</u>	<u>↓</u>	<u>HNO3</u>	<u>2.2</u>	<u> </u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>↓</u>	<u>NaOH</u>	<u>2.12</u>	<u> </u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u> </u>	<u>none</u>	<u> </u>	<u> </u>	

Monitoring Well Integrity Checklist:

Well identification number clearly marked? Yes ✓ No
 Well covers and locks in good condition and secure? Yes ✓ No
 Is the well stand pipe vertically aligned and secure? Yes ✓ No
 Is the concrete pad and surface seal in good condition? Yes ✓ No
 Are soils surrounding the well pad eroded? Yes No ✓
 Is the PVC well casing in good condition? Yes ✓ No
 Is there standing water in the annular space between the well stand pipe and PVC casing? Yes No ✓
 Is the stand pipe vented at the base to provide drainage? Yes ✓ No
 Does the total depth of the well sounded correspond with original well completion depths? Yes ✓ No

NOTES: Top of casing elevation: 998.54
 Depth to Ground Water: 8.84
 Ground Water Elevation: 989.70

Date: 12/9/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: clear 34°F
 Well Number: GMW#2D
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 32.06 ft.
 Depth to Water * 6.80 ft.
 Length of Water Column 25.26 ft.
 Volume of Water in Well 4.1 gal.(s)
 3X Volume of Water in Well 12.3 gal.(s)

Water Volume /ft. for:

2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling 15 gal.(s)
 Did well go dry? Yes No X

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify)

Water parameters:

Temperature Reading

initial 53.7
 after 5 (gal.) 56.1
 after 10 (gal.) 56.9
 after 15 (gal.) 59.4
 after (gal.)
 after (gal.)

pH Reading

4.0 Standard 4.02
 7.0 Standard 7.03
 10.0 Standard
 initial 5.37
 after 5 (gal.) 6.30
 after 10 (gal.) 6.53
 after 15 (gal.) 6.94
 after (gal.)
 after (gal.)

Conductivity Reading

84 S Standard
 1413 S Standard 1413
 initial 1646
 after 5 (gal.) 1328
 after 10 (gal.) 1493
 after 15 (gal.) 1151
 after (gal.)
 after (gal.)

Water Sample:

Time Collected: 0940

Physical Appearance at Start

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Physical Appearance at Sampling

Color clear
 Odor none
 Turbidity (> 100 NTU's) no
 Sheen/Free Product no

Sample Parameters: Metals (Cd, Cr, Cr VI, Fe, Hg, Mg, Ni, Pb, Zn), Sulfates, Cyanide

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO3</u>	<u>22</u>	<u>40C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>NaOH</u>	<u>212</u>	<u> </u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>none</u>	<u> </u>	<u> </u>	
<u>1000 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO3</u>	<u>22</u>	<u> </u>	

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes ✓ No
 Well covers and locks in good condition and secure?.....Yes ✓ No
 Is the well stand pipe vertically aligned and secure?.....Yes ✓ No
 Is the concrete pad and surface seal in good condition?.....Yes ✓ No
 Are soils surrounding the well pad eroded?.....Yes No ✓
 Is the PVC well casing in good condition?.....Yes ✓ No
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes No ✓
 Is the stand pipe vented at the base to provide drainage?.....Yes ✓ No
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes ✓ No

NOTES: Top of casing elevation: 998.42
 Depth to Ground Water: 6.80
 Ground Water Elevation: 991.62

Date: 12/9/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: Clear 43°F
 Well Number: GMW#3
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 18.50 ft.
 Depth to Water * 4.54 ft.
 Length of Water Column 13.96 ft.
 Volume of Water in Well 9.1 gal.(s)
 3X Volume of Water in Well 27.3 gal.(s)

Water Volume /ft. for:

2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling 27 gal.(s)
 Did well go dry? Yes No X

*Measurements taken from

☒ Top of Well Casing☐ Top of Protective Casing

(Other, Specify)

Water parameters:

Temperature Reading

initial 59.5
 after 9 (gal.) 56.7
 after 18 (gal.) 57.6
 after 27 (gal.) 60.2
 after (gal.)
 after (gal.)

pH Reading

4.0 Standard 3.99
 7.0 Standard 7.00
 10.0 Standard 10.00
 initial 6.08
 after 9 (gal.) 6.18
 after 18 (gal.) 6.58
 after 27 (gal.) 6.67
 after (gal.)
 after (gal.)

Conductivity Reading

84 S Standard N/A
 1413 S Standard 1416
 initial 1455
 after 9 (gal.) 1548
 after 18 (gal.) 1609
 after 27 (gal.) 1535
 after (gal.)
 after (gal.)

Water Sample:

Time Collected: 1215

Physical Appearance at Start

Color clear w/ red particles
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Physical Appearance at Sampling

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Sample Parameters: Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Zn; Sulfates, Cyanide

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO₃</u>	<u>6.2</u>	<u>40°C</u>	<u>N/A</u>
<u>1000 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO₃</u>	<u>6.2</u>	<u>40°C</u>	<u> </u>
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>NH₄OH</u>	<u>7.12</u>	<u>40°C</u>	<u> </u>
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>Cold</u>	<u> </u>	<u>40°C</u>	<u> </u>

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes ✓ No
 Well covers and locks in good condition and secure?.....Yes ✓ No
 Is the well stand pipe vertically aligned and secure?.....Yes ✓ No
 Is the concrete pad and surface seal in good condition?.....Yes ✓ No
 Are soils surrounding the well pad eroded?.....Yes No ✓
 Is the PVC well casing in good condition?.....Yes ✓ No
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes No ✓
 Is the stand pipe vented at the base to provide drainage?.....Yes ✓ No
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes ✓ No

NOTES: Top of casing elevation: 996.41
 Depth to Ground Water: 4.54
 Ground Water Elevation: 991.87

Date: 12/6/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: clear 43°F
 Well Number: GMW#3S
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 23.61 ft.
 Depth to Water * 7.97 ft.
 Length of Water Column 15.64 ft.
 Volume of Water in Well 2.6 gal.(s)
 3X Volume of Water in Well 7.8 gal.(s)

Water Volume /ft. for:

2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling 9 gal.(s)
 Did well go dry? Yes No

*Measurements taken from ☒ Top of Well Casing

☐ Top of Protective Casing

(Other, Specify)

Water parameters:

Temperature Reading

initial 60.1
 after 3 (gal.) 61.9
 after 6 (gal.) 61.1
 after 9 (gal.) 60.8
 after (gal.)
 after (gal.)

pH Reading

4.0 Standard 4.07
 7.0 Standard 7.01
 10.0 Standard N/A
 initial 6.50
 after 3 (gal.) 6.76
 after 6 (gal.) 6.80
 after 9 (gal.) 6.91
 after (gal.)
 after (gal.)

Conductivity Reading

84 S Standard N/A
 1413 S Standard 1416
 initial 1445
 after 3 (gal.) 1494
 after 6 (gal.) 1857
 after 9 (gal.) 1876
 after (gal.)
 after (gal.)

Water Sample:

Time Collected: 1345

Physical Appearance at Start

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Physical Appearance at Sampling

Color cloudy
 Odor none
 Turbidity (> 100 NTU's) no
 Sheen/Free Product no

Sample Parameters: Cd, Cr, Cr VI, Fe, Hg, Mn, Ni, Pb, Zn; Cyanide, Sulfates

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity
1000 ml	Poly	1	no	HNO ₃	<2	40°C	N
500 ml	Poly	1	no	HNO ₃	<2	40°C	
500 ml	Poly	1	no	NaOH	2.12	40°C	
500 ml	Poly	1	no	cold	—	40°C	

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes No
 Well covers and locks in good condition and secure?.....Yes No
 Is the well stand pipe vertically aligned and secure?.....Yes No
 Is the concrete pad and surface seal in good condition?.....Yes No
 Are soils surrounding the well pad eroded?.....Yes No
 Is the PVC well casing in good condition?.....Yes No
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes No
 Is the stand pipe vented at the base to provide drainage?.....Yes No
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes No

NOTES: Top of casing elevation: 997.67
 Depth to Ground Water: 7.97
 Ground Water Elevation: 989.70

Date: 12/9/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: Clear 48°F
 Well Number: GMW#3D
 Project Number: 3050.005
 Evacuation Method: bailler

Depth of Well * 36.66 ft.
 Depth to Water * 2.21 ft.
 Length of Water Column 38.95 ft.
 Volume of Water in Well 4.7 gal.(s)
 3X Volume of Water in Well 14.1 gal.(s)

Water Volume / ft. for:
 2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling 15 gal.(s)
 Did well go dry? Yes No ✓

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify)

Water parameters:

Temperature Reading

initial 60.3
 after 5 (gal.) 57.8
 after 10 (gal.) 57.0
 after 15 (gal.) 56.4
 after (gal.)
 after (gal.)

pH Reading

4.0 Standard 7.03
 7.0 Standard 3.99
 10.0 Standard NA
 initial 5.30
 after 5 (gal.) 6.05
 after 10 (gal.) 6.18
 after 15 (gal.) 6.40
 after (gal.)
 after (gal.)

Conductivity Reading

84 S Standard NA
 1413 S Standard 1410
 initial 1145
 after 5 (gal.) 1118
 after 10 (gal.) 1265
 after 15 (gal.) 1240
 after (gal.)
 after (gal.)

Water Sample:

Time Collected: 1430

Physical Appearance at Start

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Physical Appearance at Sampling

Color clear
 Odor none
 Turbidity (> 100 NTU's) no
 Sheen/Free Product no

Sample Parameters: Cd, Cr, CrVI, Fe, Hg, Ni, Pb, Zn

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity
<u>1000 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO3</u>	<u><2</u>	<u>40°C</u>	<u>NA</u>
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO3</u>	<u><2</u>	<u>40°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>NaOH</u>	<u>2.12</u>	<u>40°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>cold</u>	<u>—</u>	<u>40°C</u>	

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes ✓ No
 Well covers and locks in good condition and secure?.....Yes ✓ No
 Is the well stand pipe vertically aligned and secure?.....Yes ✓ No
 Is the concrete pad and surface seal in good condition?.....Yes ✓ No
 Are soils surrounding the well pad eroded?.....Yes No ✓
 Is the PVC well casing in good condition?.....Yes ✓ No
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes No ✓
 Is the stand pipe vented at the base to provide drainage?.....Yes ✓ No
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes ✓ No

NOTES: Top of casing elevation: 997.71
 Depth to Ground Water: 2.21
 Ground Water Elevation: 990.00

Date: 12/10/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: Clear, Sunny 31°F
 Well Number: GMW#4S
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 20.48 ft.
 Depth to Water * 5.73 ft.
 Length of Water Column 14.75 ft.
 Volume of Water in Well 9.6 gal.(s)
 3X Volume of Water in Well 28.8 gal.(s)

Water Volume /ft. for:

2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling 12 gal.(s)
 Did well go dry? Yes ☒ No ☐

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify)

Water parameters:

Temperature Reading

initial 56.2
 after 10 (gal.) 54.7
 after 12 (gal.) 55.1
 after (gal.)
 after (gal.)
 after (gal.)

pH Reading

4.0 Standard 3.98
 7.0 Standard 7.04
 10.0 Standard 11.14
 initial 5.54
 after 10 (gal.) 6.15
 after 12 (gal.) 6.22
 after (gal.)
 after (gal.)
 after (gal.)

Conductivity Reading

84 S Standard NA
 1413 S Standard 1416
 initial 4320
 after 10 (gal.) 4480
 after 12 (gal.) 4440
 after (gal.)
 after (gal.)
 after (gal.)

Water Sample:

Time Collected: 1330

Physical Appearance at Start

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Physical Appearance at Sampling

Color clear
 Odor none
 Turbidity (> 100 NTU's) no
 Sheen/Free Product no

Sample Parameters: Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Zn, Cyanide, Sulfates

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity
<u>1000 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO3</u>	<u>2.2</u>	<u>4°C</u>	<u>NA</u>
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO3</u>	<u>2.2</u>	<u>4°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>NaOH</u>	<u>2.12</u>	<u>4°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>ROD</u>	<u> </u>	<u>4°C</u>	

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes ☒ No ☐
 Well covers and locks in good condition and secure?.....Yes ☒ No ☐
 Is the well stand pipe vertically aligned and secure?.....Yes ☒ No ☐
 Is the concrete pad and surface seal in good condition?.....Yes ☒ No ☐
 Are soils surrounding the well pad eroded?.....Yes ☐ No ☒
 Is the PVC well casing in good condition?.....Yes ☒ No ☐
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes ☐ No ☒
 Is the stand pipe vented at the base to provide drainage?.....Yes ☒ No ☐
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes ☒ No ☐

NOTES: Top of casing elevation: 997.89
 Depth to Ground Water: 5.73
 Ground Water Elevation: 992.16

Date: 12/9/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: 45°F
 Well Number: GMW#4D
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 37.09 ft.
 Depth to Water * 7.12 ft.
 Length of Water Column 29.97 ft.
 Volume of Water in Well 4.9 gal.(s)
 3X Volume of Water in Well 14.7 gal.(s)

Water Volume /ft. for:

- ② Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling 15 gal.(s)
 Did well go dry? Yes No

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify)

Water parameters:

Temperature Reading

initial 59.1
 after 5 (gal.) 55.6
 after 10 (gal.) 54.5
 after 15 (gal.) 54.1
 after (gal.)
 after (gal.)

pH Reading

4.0 Standard 3.98
 7.0 Standard 7.00
 10.0 Standard NA
 initial 5.25
 after 5 (gal.) 6.16
 after 10 (gal.) 6.40
 after 15 (gal.) 6.32
 after (gal.)
 after (gal.)

Conductivity Reading

84 S Standard NA
 1413 S Standard 1412
 initial 1355
 after 5 (gal.) 1647
 after 10 (gal.) 1627
 after 15 (gal.) 1690
 after (gal.)
 after (gal.)

Water Sample:

Time Collected:

Physical Appearance at Start

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Physical Appearance at Sampling

Color clear
 Odor none
 Turbidity (> 100 NTU's) no
 Sheen/Free Product no

Sample Parameters: Cd, Cr, Cr VI, Fe, Hg, Mn, Ni, Pb, Zn; Sulfates, Cyanide

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity
<u>1000 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO₃</u>	<u>2.2</u>	<u>40°C</u>	<u>NA</u>
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO₃</u>	<u>2.2</u>	<u>40°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>NaOH</u>	<u>2.12</u>	<u>40°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>old</u>	<u>—</u>	<u>40°C</u>	

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes ✓ No
 Well covers and locks in good condition and secure?.....Yes ✓ No
 Is the well stand pipe vertically aligned and secure?.....Yes ✓ No
 Is the concrete pad and surface seal in good condition?.....Yes ✓ No
 Are soils surrounding the well pad eroded?.....Yes No ✓
 Is the PVC well casing in good condition?.....Yes ✓ No
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes No ✓
 Is the stand pipe vented at the base to provide drainage?.....Yes ✓ No
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes ✓ No

NOTES: Top of casing elevation: 999.25
 Depth to Ground Water: 7.12
 Ground Water Elevation: 992.13

Date: 12/10/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: Clear 38°F
 Well Number: GMW#5S
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 23.83 ft.
 Depth to Water * 7.32 ft.
 Length of Water Column 16.51 ft.
 Volume of Water in Well 2.7 gal.(s)
 3X Volume of Water in Well 8.1 gal.(s)

Water Volume /ft. for:

② Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling 9 gal.(s)
 Did well go dry? Yes No

*Measurements taken from

☒ Top of Well Casing☐ Top of Protective Casing

(Other, Specify)

Water parameters:

Temperature Reading

initial 59.1
 after 3 (gal.) 58.2
 after 6 (gal.) 58.1
 after 9 (gal.) 58.2
 after (gal.)
 after (gal.)

pH Reading

4.0 Standard 4.03
 7.0 Standard 7.02
 10.0 Standard NA
 initial 6.44
 after 3 (gal.) 6.49
 after 6 (gal.) 6.52
 after 9 (gal.) 6.53
 after (gal.)
 after (gal.)

Conductivity Reading

84 S Standard NA
 1413 S Standard 1406
 initial 2890
 after 3 (gal.) 2890
 after 6 (gal.) 2950
 after 9 (gal.) 3120
 after (gal.)
 after (gal.)

Water Sample:

Time Collected: 1145

Physical Appearance at Start

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Physical Appearance at Sampling

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Sample Parameters: Cd, Cr, Cr VI, Fe, Hg, Mn, Ni, Pb, Zn; Cyanide, Sulfates

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity
<u>1000 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO3</u>	<u><2</u>	<u>4°C</u>	<u>NA</u>
<u>1000 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO3</u>	<u><2</u>	<u>4°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>NaOH</u>	<u>2.12</u>	<u>4°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>cold</u>	<u>-</u>	<u>4°C</u>	

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes No
 Well covers and locks in good condition and secure?.....Yes No
 Is the well stand pipe vertically aligned and secure?.....Yes No
 Is the concrete pad and surface seal in good condition?.....Yes No
 Are soils surrounding the well pad eroded?.....Yes No
 Is the PVC well casing in good condition?.....Yes No
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes No
 Is the stand pipe vented at the base to provide drainage?.....Yes No
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes No

NOTES: Top of casing elevation: 1003.25
 Depth to Ground Water: 7.32
 Ground Water Elevation: 995.93

Date: 12/10/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: partly cloudy, 48°F
 Well Number: GMW#5D
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 37.77 ft.
 Depth to Water * 9.78 ft.
 Length of Water Column 32.99 ft.
 Volume of Water in Well 4.6 gal.(s)
 3X Volume of Water in Well 13.8 gal.(s)

Water Volume /ft. for:

2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling 15 gal.(s)
 Did well go dry? Yes No

*Measurements taken from

☒ Top of Well Casing☐ Top of Protective Casing

(Other, Specify)

Water parameters:

Temperature Reading

initial 60.9
 after 5 (gal.) 61.3
 after 10 (gal.) 57.9
 after 15 (gal.) 55.4
 after (gal.)
 after (gal.)

pH Reading

4.0 Standard 4.01
 7.0 Standard 5.04
 10.0 Standard NA
 initial 7.03
 after 5 (gal.) 7.17
 after 10 (gal.) 7.22
 after 15 (gal.) 7.19
 after (gal.)
 after (gal.)

Conductivity Reading

84 S Standard NA
 1413 S Standard 1418
 initial 1528
 after 5 (gal.) 2230
 after 10 (gal.) 1686
 after 15 (gal.) 1484
 after (gal.)
 after (gal.)

Water Sample:

Time Collected: 1230

Physical Appearance at Start

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Physical Appearance at Sampling

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Sample Parameters: Cd, Cr, Cr VI, Fe, Hg, Mn, Ni, Pb, Zn; Cyanide; Sulfates

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity
<u>1000 ml</u>	<u>Poly</u>	<u>1</u>	<u>NO</u>	<u>HNO3</u>	<u>22</u>	<u>40°C</u>	<u>NA</u>
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>NO</u>	<u>HNO3</u>	<u>22</u>	<u>40°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>NO</u>	<u>NaOH</u>	<u>212</u>	<u>40°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>NO</u>	<u>Cold</u>	<u>—</u>	<u>40°C</u>	

Monitoring Well Integrity Checklist:

Well identification number clearly marked? Yes No
 Well covers and locks in good condition and secure? Yes No
 Is the well stand pipe vertically aligned and secure? Yes No
 Is the concrete pad and surface seal in good condition? Yes No
 Are soils surrounding the well pad eroded? Yes No
 Is the PVC well casing in good condition? Yes No
 Is there standing water in the annular space between the well stand pipe and PVC casing? Yes No
 Is the stand pipe vented at the base to provide drainage? Yes No
 Does the total depth of the well sounded correspond with original well completion depths? Yes No

NOTES: Top of casing elevation: 1003.25
 Depth to Ground Water: 9.78
 Ground Water Elevation: 993.47

Date: 12/10/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: Clear 32°F
 Well Number: GMW#9
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 29.97 ft.
 Depth to Water * 5.49 ft.
 Length of Water Column 24.48 ft.
 Volume of Water in Well 4 gal.(s)
 3X Volume of Water in Well 12 gal.(s)

Water Volume /ft. for:

2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling 12 gal.(s)
 Did well go dry? Yes No ✓

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify)

Water parameters:

Temperature Reading

initial 55
 after 4 (gal.) 56.5
 after 8 (gal.) 57.4
 after 12 (gal.) 57.7
 after (gal.)
 after (gal.)

pH Reading

4.0 Standard 4.01
 7.0 Standard 7.04
 10.0 Standard N/A
 initial 6.62
 after 4 (gal.) 6.61
 after 8 (gal.) 6.58
 after 12 (gal.) 6.69
 after (gal.)
 after (gal.)

Conductivity Reading

84 S Standard N/A
 1413 S Standard 1418
 initial 1312
 after 4 (gal.) 1307
 after 8 (gal.) 1245
 after 12 (gal.) 1233
 after (gal.)
 after (gal.)

Water Sample:

Time Collected: 1035

Physical Appearance at Start

Color clear
 Odor none
 Turbidity (> 100 NTUs) no
 Sheen/Free Product no

Physical Appearance at Sampling

Color slightly cloudy
 Odor none
 Turbidity (> 100 NTU's) no
 Sheen/Free Product no

Sample Parameters: Cd, Cr, Cr VI, Fe, Ag, Mn, Ni, Pb, Zn, Cyanide, Sulfates

Container, Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity
<u>1000 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO3</u>	<u>2.2</u>	<u>40°C</u>	<u>N/A</u>
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>HNO3</u>	<u>2.2</u>	<u>40°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>NaOH</u>	<u>2.12</u>	<u>40°C</u>	
<u>500 ml</u>	<u>Poly</u>	<u>1</u>	<u>no</u>	<u>acid</u>	<u>-</u>	<u>40°C</u>	

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes ✓ No
 Well covers and locks in good condition and secure?.....Yes ✓ No
 Is the well stand pipe vertically aligned and secure?.....Yes ✓ No
 Is the concrete pad and surface seal in good condition?.....Yes ✓ No
 Are soils surrounding the well pad eroded?.....Yes ✓ No ✓
 Is the PVC well casing in good condition?.....Yes ✓ No
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes ✓ No ✓
 Is the stand pipe vented at the base to provide drainage?.....Yes ✓ No
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes ✓ No

NOTES: Top of casing elevation: 997.34
 Depth to Ground Water: 5.49
 Ground Water Elevation: 991.85

Date: 12/8/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: _____
 Well Number: GMW#6S
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 21.55 ft.
 Depth to Water * 5.90 ft.
 Length of Water Column _____ ft.
 Volume of Water in Well _____ gal.(s)
 3X Volume of Water in Well _____ gal.(s)

Water Volume /ft. for:
 2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling _____ gal.(s)
 Did well go dry? Yes _____ No _____

Water level only

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify)

Water parameters:

Temperature Reading

initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

pH Reading

4.0 Standard _____
 7.0 Standard _____
 10.0 Standard _____
 initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

Conductivity Reading

84 S Standard _____
 1413 S Standard _____
 initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

Water Sample:
 Time Collected: _____

Physical Appearance at Start

Color _____
 Odor _____
 Turbidity (> 100 NTUs) _____
 Sheen/Free Product _____

Physical Appearance at Sampling

Color _____
 Odor _____
 Turbidity (> 100 NTUs) _____
 Sheen/Free Product _____

Sample Parameters:

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes ☒ No _____
 Well covers and locks in good condition and secure?.....Yes ☒ No _____
 Is the well stand pipe vertically aligned and secure?.....Yes ☒ No _____
 Is the concrete pad and surface seal in good condition?.....Yes ☒ No _____
 Are soils surrounding the well pad eroded?.....Yes ☒ No ☒
 Is the PVC well casing in good condition?.....Yes ☒ No ☒
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes ☒ No ☒
 Is the stand pipe vented at the base to provide drainage?.....Yes ☒ No _____
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes ☒ No _____

NOTES: Top of casing elevation: 999.42
 Depth to Ground Water: 5.90
 Ground Water Elevation: 993.52 994.52

Date: 12/8/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: _____
 Well Number: GMW#6D
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 28.65 ft.
 Depth to Water * 5.94 ft.
 Length of Water Column _____ ft.
 Volume of Water in Well _____ gal.(s)
 3X Volume of Water in Well _____ gal.(s)

Water Volume /ft. for:

2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling _____ gal.(s)
 Did well go dry? Yes _____ No _____

Water level only

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify) _____

Water parameters:

Temperature Reading

pH Reading

Conductivity Reading

initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

4.0 Standard _____
 7.0 Standard _____
 10.0 Standard _____
 initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

84'S Standard _____
 1413 S Standard _____
 initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

Water Sample:

Time Collected: _____

Physical Appearance at Start

Physical Appearance at Sampling

Color _____
 Odor _____
 Turbidity (> 100 NTUs) _____
 Sheen/Free Product _____

Color _____
 Odor _____
 Turbidity (> 100 NTU's) _____
 Sheen/Free Product _____

Sample Parameters:

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes ☒ No _____
 Well covers and locks in good condition and secure?.....Yes ☒ No _____
 Is the well stand pipe vertically aligned and secure?.....Yes ☒ No _____
 Is the concrete pad and surface seal in good condition?.....Yes ☒ No _____
 Are soils surrounding the well pad eroded?.....Yes ☒ No ☒
 Is the PVC well casing in good condition?.....Yes ☒ No _____
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes ☒ No ☒
 Is the stand pipe vented at the base to provide drainage?.....Yes ☒ No _____
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes ☒ No _____

NOTES: Top of casing elevation: 998.47
 Depth to Ground Water: 5.94
 Ground Water Elevation: 992.53 986.53

Date: 12/8/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: _____
 Well Number: GMW#7
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 27.87 ft.
 Depth to Water * 7.01 ft.
 Length of Water Column 20.86 ft.
 Volume of Water in Well 3.4 gal.(s)
 3X Volume of Water in Well 10.2 gal.(s)

Water Volume /ft. for:

2" Diameter Well = 0.163 X LWC

4" Diameter Well = 0.653 X LWC

6" Diameter Well = 1.469 X LWC

Volume removed before sampling _____ gal.(s)
 Did well go dry? Yes _____ No _____

Water level only

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify)

Water parameters:

Temperature Reading

initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

pH Reading

4.0 Standard _____
 7.0 Standard _____
 10.0 Standard _____
 initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

Conductivity Reading

84 S Standard _____
 1413 S Standard _____
 initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

Water Sample:

Time Collected: _____

Physical Appearance at Start

Color _____
 Odor _____
 Turbidity (> 100 NTUs) _____
 Sheen/Free Product _____

Physical Appearance at Sampling

Color _____
 Odor _____
 Turbidity (> 100 NTU's) _____
 Sheen/Free Product _____

Sample Parameters:

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity

Monitoring Well Integrity Checklist:

Well identification number clearly marked? Yes ☒ No _____
 Well covers and locks in good condition and secure? Yes ☒ No _____
 Is the well stand pipe vertically aligned and secure? Yes ☒ No _____
 Is the concrete pad and surface seal in good condition? Yes ☒ No _____
 Are soils surrounding the well pad eroded? Yes ☒ No ☒
 Is the PVC well casing in good condition? Yes ☒ No _____
 Is there standing water in the annular space between the well stand pipe and PVC casing? Yes ☒ No ☒
 Is the stand pipe vented at the base to provide drainage? Yes ☒ No _____
 Does the total depth of the well sounded correspond with original well completion depths? Yes ☒ No _____

NOTES: Top of casing elevation: 997.42
 Depth to Ground Water: 7.01
 Ground Water Elevation: 990.41 987.41

Date: 12/8/98
Site Name: Inland Realty Co.
Site Location: Maryville, MO
Personnel: William E. Wright

Weather: _____
Well Number: PZ-1
Project Number: 3050.005
Evacuation Method: bailer

Depth of Well * 20.32 ft.
Depth to Water * 8.52 ft.
Length of Water Column _____ ft.
Volume of Water in Well _____ gal.(s)
3X Volume of Water in Well _____ gal.(s)

Water Volume /ft. for:

2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling _____ gal.(s)
Did well go dry? Yes _____ No _____

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify) _____

Water parameters:

Temperature Reading

initial _____

after _____ (gal.) _____
after _____ (gal.) _____
after _____ (gal.) _____
after _____ (gal.) _____
after _____ (gal.) _____

pH Reading

4.0 Standard _____

7.0 Standard _____

10.0 Standard _____

initial _____

after _____ (gal.) _____
after _____ (gal.) _____
after _____ (gal.) _____
after _____ (gal.) _____
after _____ (gal.) _____

Conductivity Reading

84 S Standard _____

1413 S Standard _____

initial _____

after _____ (gal.) _____
after _____ (gal.) _____
after _____ (gal.) _____
after _____ (gal.) _____
after _____ (gal.) _____

Water Sample:

Time Collected: _____

Physical Appearance at Start

Color _____
Odor _____
Turbidity (> 100 NTUs) _____
Sheen/Free Product _____

Physical Appearance at Sampling

Color _____
Odor _____
Turbidity (> 100 NTU's) _____
Sheen/Free Product _____

Sample Parameters: **Water Level Only**

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes _____ No _____
Well covers and locks in good condition and secure?.....Yes _____ No _____
Is the well stand pipe vertically aligned and secure?.....Yes _____ No _____
Is the concrete pad and surface seal in good condition?.....Yes _____ No _____
Are soils surrounding the well pad eroded?.....Yes _____ No _____
Is the PVC well casing in good condition?.....Yes _____ No _____
Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes _____ No _____
Is the stand pipe vented at the base to provide drainage?.....Yes _____ No _____
Does the total depth of the well sounded correspond with original well completion depths?.....Yes _____ No _____

NOTES: Top of casing elevation: 1001.66
Depth to Ground Water: 8.52
Ground Water Elevation: 993.14

Date: 12/8/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: _____
 Well Number: PZ-2
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 20.32 ft.
 Depth to Water * 2.59 ft.
 Length of Water Column _____ ft.
 Volume of Water in Well _____ gal.(s)
 3X Volume of Water in Well _____ gal.(s)

Water Volume /ft. for:
 2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling _____ gal.(s)
 Did well go dry? Yes _____ No _____

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify)

Water parameters:

Temperature Reading

initial _____

after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

pH Reading

4.0 Standard _____

7.0 Standard _____

10.0 Standard _____

initial _____

after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

Conductivity Reading

84 S Standard _____

1413 S Standard _____

initial _____

after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

Water Sample:

Time Collected: _____

Physical Appearance at Start

Color _____
 Odor _____
 Turbidity (> 100 NTUs) _____
 Sheen/Free Product _____

Physical Appearance at Sampling

Color _____
 Odor _____
 Turbidity (> 100 NTU's) _____
 Sheen/Free Product _____

Sample Parameters: **Water Level Only**

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes _____ No _____
 Well covers and locks in good condition and secure?.....Yes _____ No _____
 Is the well stand pipe vertically aligned and secure?.....Yes _____ No _____
 Is the concrete pad and surface seal in good condition?.....Yes _____ No _____
 Are soils surrounding the well pad eroded?.....Yes _____ No _____
 Is the PVC well casing in good condition?.....Yes _____ No _____
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes _____ No _____
 Is the stand pipe vented at the base to provide drainage?.....Yes _____ No _____
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes _____ No _____

NOTES: Top of casing elevation: 1001.97
 Depth to Ground Water: 2.59
 Ground Water Elevation: 994.38

Date: 12/8/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: _____
 Well Number: PZ-3
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 20.28 ft.
 Depth to Water * 7.59 ft.
 Length of Water Column _____ ft.
 Volume of Water in Well _____ gal.(s)
 3X Volume of Water in Well _____ gal.(s)

Water Volume /ft. for:
 2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling _____ gal.(s)
 Did well go dry? Yes _____ No _____

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify) _____

Water parameters:

Temperature Reading

initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

pH Reading

4.0 Standard _____
 7.0 Standard _____
 10.0 Standard _____
 initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

Conductivity Reading

84 S Standard _____
 1413 S Standard _____
 initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

Water Sample:

Time Collected: _____

Physical Appearance at Start

Color _____
 Odor _____
 Turbidity (> 100 NTUs) _____
 Sheen/Free Product _____

Physical Appearance at Sampling

Color _____
 Odor _____
 Turbidity (> 100 NTU's) _____
 Sheen/Free Product _____

Sample Parameters: **Water Level Only**

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes _____ No _____
 Well covers and locks in good condition and secure?.....Yes _____ No _____
 Is the well stand pipe vertically aligned and secure?.....Yes _____ No _____
 Is the concrete pad and surface seal in good condition?.....Yes _____ No _____
 Are soils surrounding the well pad eroded?.....Yes _____ No _____
 Is the PVC well casing in good condition?.....Yes _____ No _____
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes _____ No _____
 Is the stand pipe vented at the base to provide drainage?.....Yes _____ No _____
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes _____ No _____

NOTES: Top of casing elevation: 1002.52
 Depth to Ground Water: 7.59
 Ground Water Elevation: 994.93

Date: 12/8/98
 Site Name: Inland Realty Co.
 Site Location: Maryville, MO
 Personnel: William E. Wright

Weather: _____
 Well Number: PZ-4
 Project Number: 3050.005
 Evacuation Method: bailer

Depth of Well * 20.14 ft.
 Depth to Water * 8.38 ft.
 Length of Water Column _____ ft.
 Volume of Water in Well _____ gal.(s)
 3X Volume of Water in Well _____ gal.(s)

Water Volume /ft. for:
 2" Diameter Well = 0.163 X LWC
 4" Diameter Well = 0.653 X LWC
 6" Diameter Well = 1.469 X LWC

Volume removed before sampling _____ gal.(s)
 Did well go dry? Yes _____ No _____

*Measurements taken from ☒ Top of Well Casing ☐ Top of Protective Casing ☐ (Other, Specify) _____

Water parameters:

Temperature Reading

initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

pH Reading

4.0 Standard _____
 7.0 Standard _____
 10.0 Standard _____
 initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

Conductivity Reading

84 S Standard _____
 1413 S Standard _____
 initial _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____
 after _____ (gal.) _____

Water Sample: _____
 Time Collected: _____

Physical Appearance at Start

Color _____
 Odor _____
 Turbidity (> 100 NTUs) _____
 Sheen/Free Product _____

Physical Appearance at Sampling

Color _____
 Odor _____
 Turbidity (> 100 NTUs) _____
 Sheen/Free Product _____

Sample Parameters: **Water Level Only**

Container Size	Container Type	# Collected	Filtered	Preservative	pH	Temp.	Conductivity

Monitoring Well Integrity Checklist:

Well identification number clearly marked?.....Yes _____ No _____
 Well covers and locks in good condition and secure?.....Yes _____ No _____
 Is the well stand pipe vertically aligned and secure?.....Yes _____ No _____
 Is the concrete pad and surface seal in good condition?.....Yes _____ No _____
 Are soils surrounding the well pad eroded?.....Yes _____ No _____
 Is the PVC well casing in good condition?.....Yes _____ No _____
 Is there standing water in the annular space between the well stand pipe and PVC casing?.....Yes _____ No _____
 Is the stand pipe vented at the base to provide drainage?.....Yes _____ No _____
 Does the total depth of the well sounded correspond with original well completion depths?.....Yes _____ No _____

NOTES: Top of casing elevation: 1002.37
 Depth to Ground Water: 8.38
 Ground Water Elevation: 993.99

Laboratory analytical reports

3050.005
Naklof, NHD
1998

AMERICAN TECHNICAL & ANALYTICAL SERVICES, INC.

875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 • FAX (314) 434-0080

December 28, 1998

William E. Wright
O'Brien & Gere Engineers, Inc.
5000 Cedar Plaza Parkway
St. Louis, MO 63128

RE: ATAS #24890.01-#24890.05
#3050.005 - Inland Realty Co, Maryville, Missouri

Dear Mr. Wright:

Enclosed are the analytical reports for the samples received in our laboratory on December 11, 1998.

If, in your review, you should have any questions or require additional information, please call me at (314) 434-4570.

Thank you for choosing ATAS for your analytical needs.

Sincerely,


Ruseal Brewer
Project Manager

Enclosures

RB/jp

ATAS

"Professional Commitment"



875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2489001MT(706)

DATE : 12-28-98

SAMPLE MATRIX : WATER
ATAS # : 24890.01
DATE SUBMITTED: 12-11-98
PROJECT : #3050.005 - INLAND REALTY CO, MARYVILLE, MISSOURI
SAMPLE ID : GMW #4S

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
INORGANICS					
TOTAL CYANIDE	0.005	mg/L	0.015	12-16-98	SW 9010
SULFATE	667	mg/L	1990	12-22-98	EPA 375.4
METALS					
CADMIUM	0.005	mg/L	0.007	12-18-98	SW 6010
CHROMIUM	0.005	mg/L	0.007	12-18-98	SW 6010
HEXAVALENT CHROMIUM	0.05	mg/L	0.061	12-11-98	SW 7196
IRON	0.05	mg/L	0.552	12-21-98	SW 6010
LEAD	0.002	mg/L	ND	12-16-98	SW 6010
MANGANESE	0.005	mg/L	30.3	12-16-98	SW 6010
MERCURY	0.0002	mg/L	ND	12-17-98	SW 7470
NICKEL	0.005	mg/L	0.431	12-16-98	SW 6010
ZINC	0.010	mg/L	1.61	12-16-98	SW 6010

mg/L = PARTS PER MILLION (PPM)

ND = NOT DETECTED ABOVE REPORTING LIMIT



875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2489001MT(706)

DATE : 12-28-98

SAMPLE MATRIX : WATER
ATAS # : 24890.02
DATE SUBMITTED: 12-11-98
PROJECT : #3050.005 - INLAND REALTY CO, MARYVILLE, MISSOURI
SAMPLE ID : GMW #5S

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
INORGANICS					
TOTAL CYANIDE	0.005	mg/L	ND	12-16-98	SW 9010
SULFATE	40	mg/L	124	12-22-98	EPA 375.4
METALS					
CADMIUM	0.005	mg/L	ND	12-18-98	SW 6010
CHROMIUM	0.005	mg/L	ND	12-18-98	SW 6010
HEXAVALENT CHROMIUM	0.05	mg/L	ND	12-11-98	SW 7196
IRON	0.05	mg/L	0.472	12-21-98	SW 6010
LEAD	0.002	mg/L	ND	12-16-98	SW 6010
MANGANESE	0.005	mg/L	0.259	12-16-98	SW 6010
MERCURY	0.0002	mg/L	ND	12-17-98	SW 7470
NICKEL	0.005	mg/L	0.011	12-16-98	SW 6010
ZINC	0.010	mg/L	ND	12-16-98	SW 6010

mg/L = PARTS PER MILLION (PPM)

ND = NOT DETECTED ABOVE REPORTING LIMIT



875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2489001MT(706)

DATE : 12-28-98

SAMPLE MATRIX : WATER
ATAS # : 24890.03
DATE SUBMITTED: 12-11-98
PROJECT : #3050.005 - INLAND REALTY CO, MARYVILLE, MISSOURI
SAMPLE ID : GMW #5D

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
INORGANICS					
TOTAL CYANIDE	0.005	mg/L	ND	12-16-98	SW 9010
SULFATE	10	mg/L	35.9	12-22-98	EPA 375.4
METALS					
CADMIUM	0.005	mg/L	ND	12-18-98	SW 6010
CHROMIUM	0.005	mg/L	ND	12-18-98	SW 6010
HEXAVALENT CHROMIUM	0.05	mg/L	ND	12-11-98	SW 7196
IRON	0.05	mg/L	2.97	12-21-98	SW 6010
LEAD	0.002	mg/L	ND	12-16-98	SW 6010
MANGANESE	0.005	mg/L	1.11	12-16-98	SW 6010
MERCURY	0.0002	mg/L	ND	12-17-98	SW 7470
NICKEL	0.005	mg/L	ND	12-16-98	SW 6010
ZINC	0.010	mg/L	ND	12-16-98	SW 6010

mg/L = PARTS PER MILLION (PPM)

ND = NOT DETECTED ABOVE REPORTING LIMIT



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CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2489001MT(706)

DATE : 12-28-98

SAMPLE MATRIX : WATER
ATAS # : 24890.04
DATE SUBMITTED: 12-11-98
PROJECT : #3050.005 - INLAND REALTY CO, MARYVILLE, MISSOURI
SAMPLE ID : GMW #9

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
INORGANICS					
TOTAL CYANIDE	0.005	mg/L	ND	12-16-98	SW 9010
SULFATE	100	mg/L	176	12-22-98	EPA 375.4
METALS					
CADMIUM	0.005	mg/L	ND	12-18-98	SW 6010
CHROMIUM	0.005	mg/L	ND	12-18-98	SW 6010
HEXAVALENT CHROMIUM	0.05	mg/L	ND	12-11-98	SW 7196
IRON	0.05	mg/L	10.1	12-21-98	SW 6010
LEAD	0.002	mg/L	ND	12-16-98	SW 6010
MANGANESE	0.005	mg/L	0.701	12-16-98	SW 6010
MERCURY	0.0002	mg/L	ND	12-17-98	SW 7470
NICKEL	0.005	mg/L	ND	12-16-98	SW 6010
ZINC	0.010	mg/L	0.013	12-16-98	SW 6010

mg/L = PARTS PER MILLION (PPM)

ND = NOT DETECTED ABOVE REPORTING LIMIT

CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2489001MT(706)

DATE : 12-28-98

SAMPLE MATRIX : WATER
ATAS # : 24890.05
DATE SUBMITTED: 12-11-98
PROJECT : #3050.005 - INLAND REALTY CO, MARYVILLE, MISSOURI
SAMPLE ID : GMW #10

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
INORGANICS					
TOTAL CYANIDE	0.005	mg/L	ND	12-16-98	SW 9010
SULFATE	1.0	mg/L	1.2	12-22-98	EPA 375.4
METALS					
CADMIUM	0.005	mg/L	ND	12-18-98	SW 6010
CHROMIUM	0.005	mg/L	ND	12-18-98	SW 6010
HEXAVALENT CHROMIUM	0.05	mg/L	ND	12-11-98	SW 7196
IRON	0.05	mg/L	ND	12-21-98	SW 6010
LEAD	0.002	mg/L	ND	12-16-98	SW 6010
MANGANESE	0.005	mg/L	ND	12-16-98	SW 6010
MERCURY	0.0002	mg/L	ND	12-17-98	SW 7470
NICKEL	0.005	mg/L	ND	12-16-98	SW 6010
ZINC	0.010	mg/L	ND	12-16-98	SW 6010



875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2489001MT(706)

DATE : 12-28-98

QA/QC

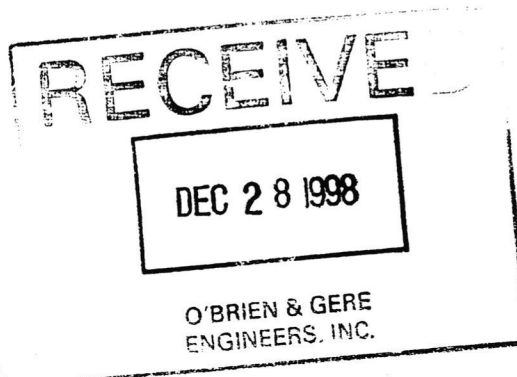
<u>DESCRIPTION</u>		<u>PARAMETER</u>	<u>RESULTS</u>	
METHOD BLANK	12-16-98	TOTAL CYANIDE	<0.005	mg/L
METHOD BLANK	12-22-98	SULFATE	<10	mg/L
METHOD BLANK	12-18-98	CADMIUM	<0.005	mg/L
METHOD BLANK	12-18-98	CHROMIUM	<0.005	mg/L
METHOD BLANK	12-11-98	HEXAVALENT CHROMIUM	<0.05	mg/L
METHOD BLANK	12-21-98	IRON	<0.05	mg/L
METHOD BLANK	12-15-98	LEAD	<0.002	mg/L
METHOD BLANK	12-15-98	MANGANESE	<0.005	mg/L
METHOD BLANK	12-17-98	MERCURY	<0.0002	mg/L
METHOD BLANK	12-15-98	NICKEL	<0.005	mg/L
METHOD BLANK	12-15-98	ZINC	<0.010	mg/L
CONTROL SPIKE	12-16-98	TOTAL CYANIDE	87 %	RECOVERY
CONTROL SPIKE	12-22-98	SULFATE	101 %	RECOVERY
CONTROL SPIKE	12-18-98	CADMIUM	96 %	RECOVERY
CONTROL SPIKE	12-18-98	CHROMIUM	99 %	RECOVERY
CONTROL SPIKE	12-11-98	HEXAVALENT CHROMIUM	100 %	RECOVERY
CONTROL SPIKE	12-21-98	IRON	101 %	RECOVERY
CONTROL SPIKE	12-15-98	LEAD	98 %	RECOVERY
CONTROL SPIKE	12-15-98	MANGANESE	94 %	RECOVERY
CONTROL SPIKE	12-17-98	MERCURY	102 %	RECOVERY
CONTROL SPIKE	12-15-98	NICKEL	97 %	RECOVERY
CONTROL SPIKE	12-15-98	ZINC	96 %	RECOVERY

AMERICAN TECHNICAL & ANALYTICAL SERVICES, INC.

875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 • FAX (314) 434-0080

December 23, 1998

William E. Wright
O'Brien & Gere Engineers, Inc.
5000 Cedar Plaza Parkway
St. Louis, MO 63128



RE: ATAS #24875.01-#24875.06
#3050.005 - Inland Realty Co, Maryville, Missouri

Dear Mr. Wright:

Enclosed are the analytical reports for the samples received in our laboratory on December 10, 1998.

If, in your review, you should have any questions or require additional information, please call me at (314) 434-4570.

Thank you for choosing ATAS for your analytical needs.

Sincerely,

Ruseal Brewer
Project Manager

Enclosures

RB/jp

ATAS

"Professional Commitment"

CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2487501MT(706)

DATE : 12-23-98

SAMPLE MATRIX : WATER
ATAS # : 24875.01
DATE SUBMITTED: 12-10-98
PROJECT : #3050.005 - INLAND REALTY CO, MARYVILLE, MISSOURI
SAMPLE ID : GMW #2S

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
INORGANICS					
TOTAL CYANIDE	0.005	mg/L	0.015	12-16-98	SW 9010
SULFATE	200	mg/L	564	12-22-98	EPA 375.4
METALS					
CADMIUM	0.005	mg/L	ND	12-11-98	SW 6010
CHROMIUM	0.005	mg/L	ND	12-11-98	SW 6010
HEXAVALENT CHROMIUM	0.05	mg/L	ND	12-10-98	SW 7196
IRON	0.05	mg/L	2.41	12-21-98	SW 6010
LEAD	0.002	mg/L	ND	12-16-98	SW 6010
MANGANESE	0.005	mg/L	1.75	12-16-98	SW 6010
MERCURY	0.0002	mg/L	ND	12-17-98	SW 7470
NICKEL	0.005	mg/L	0.008	12-16-98	SW 6010
ZINC	0.010	mg/L	ND	12-16-98	SW 6010

mg/L = PARTS PER MILLION (PPM)

ND = NOT DETECTED ABOVE REPORTING LIMIT



875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2487501MT(706)

DATE : 12-23-98

SAMPLE MATRIX : WATER
ATAS # : 24875.02
DATE SUBMITTED: 12-10-98
PROJECT : #3050.005 - INLAND REALTY CO, MARYVILLE, MISSOURI
SAMPLE ID : GMW #2D

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
INORGANICS					
TOTAL CYANIDE	0.005	mg/L	ND	12-16-98	SW 9010
SULFATE	50	mg/L	165	12-22-98	EPA 375.4
METALS					
CADMIUM	0.005	mg/L	ND	12-11-98	SW 6010
CHROMIUM	0.005	mg/L	ND	12-11-98	SW 6010
HEXAVALENT CHROMIUM	0.05	mg/L	ND	12-10-98	SW 7196
IRON	0.05	mg/L	7.77	12-21-98	SW 6010
LEAD	0.002	mg/L	ND	12-16-98	SW 6010
MANGANESE	0.005	mg/L	0.572	12-16-98	SW 6010
MERCURY	0.0002	mg/L	ND	12-17-98	SW 7470
NICKEL	0.005	mg/L	ND	12-16-98	SW 6010
ZINC	0.010	mg/L	ND	12-16-98	SW 6010

mg/L = PARTS PER MILLION (PPM)

ND = NOT DETECTED ABOVE REPORTING LIMIT

CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2487501MT(706)

DATE : 12-23-98

SAMPLE MATRIX : WATER
ATAS # : 24875.03
DATE SUBMITTED: 12-10-98
PROJECT : #3050.005 - INLAND REALTY CO, MARYVILLE, MISSOURI
SAMPLE ID : GMW #3

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
INORGANICS					
TOTAL CYANIDE	0.005	mg/L	ND	12-16-98	SW 9010
SULFATE	100	mg/L	246	12-22-98	EPA 375.4
METALS					
CADMIUM	0.005	mg/L	0.019	12-11-98	SW 6010
CHROMIUM	0.005	mg/L	ND	12-11-98	SW 6010
HEXAVALENT CHROMIUM	0.05	mg/L	ND	12-10-98	SW 7196
IRON	0.05	mg/L	13.9	12-21-98	SW 6010
LEAD	0.002	mg/L	ND	12-16-98	SW 6010
MANGANESE	0.005	mg/L	1.01	12-16-98	SW 6010
MERCURY	0.0002	mg/L	ND	12-17-98	SW 7470
NICKEL	0.005	mg/L	ND	12-16-98	SW 6010
ZINC	0.010	mg/L	0.020	12-16-98	SW 6010

CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2487501MT(706)

DATE : 12-23-98

SAMPLE MATRIX : WATER
ATAS # : 24875.04
DATE SUBMITTED: 12-10-98
PROJECT : #3050.005 - INLAND REALTY CO, MARYVILLE, MISSOURI
SAMPLE ID : GMW #3S

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
INORGANICS					
TOTAL CYANIDE	0.005	mg/L	0.047	12-16-98	SW 9010
SULFATE	200	mg/L	517	12-22-98	EPA 375.4
METALS					
CADMIUM	0.005	mg/L	ND	12-11-98	SW 6010
CHROMIUM	0.005	mg/L	ND	12-11-98	SW 6010
HEXAVALENT CHROMIUM	0.05	mg/L	ND	12-10-98	SW 7196
IRON	0.05	mg/L	0.227	12-21-98	SW 6010
LEAD	0.002	mg/L	ND	12-16-98	SW 6010
MANGANESE	0.005	mg/L	0.407	12-16-98	SW 6010
MERCURY	0.0002	mg/L	ND	12-17-98	SW 7470
NICKEL	0.005	mg/L	0.005	12-16-98	SW 6010
ZINC	0.010	mg/L	ND	12-16-98	SW 6010



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CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2487501MT(706)

DATE : 12-23-98

SAMPLE MATRIX : WATER
ATAS # : 24875.05
DATE SUBMITTED: 12-10-98
PROJECT : #3050.005 - INLAND REALTY CO, MARYVILLE, MISSOURI
SAMPLE ID : GMW #3D

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
INORGANICS					
TOTAL CYANIDE	0.005	mg/L	ND	12-16-98	SW 9010
SULFATE	50	mg/L	131	12-22-98	EPA 375.4
METALS					
CADMIUM	0.005	mg/L	ND	12-11-98	SW 6010
CHROMIUM	0.005	mg/L	ND	12-11-98	SW 6010
HEXAVALENT CHROMIUM	0.05	mg/L	ND	12-10-98	SW 7196
IRON	0.05	mg/L	7.62	12-21-98	SW 6010
LEAD	0.002	mg/L	ND	12-16-98	SW 6010
MANGANESE	0.005	mg/L	0.551	12-16-98	SW 6010
MERCURY	0.0002	mg/L	ND	12-17-98	SW 7470
NICKEL	0.005	mg/L	ND	12-16-98	SW 6010
ZINC	0.010	mg/L	0.013	12-16-98	SW 6010

mg/L = PARTS PER MILLION (PPM)

ND = NOT DETECTED ABOVE REPORTING LIMIT



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CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2487501MT(706)

DATE : 12-23-98

SAMPLE MATRIX : WATER
ATAS # : 24875.06
DATE SUBMITTED: 12-10-98
PROJECT : #3050.005 - INLAND REALTY CO, MARYVILLE, MISSOURI
SAMPLE ID : GMW #4D

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
INORGANICS					
TOTAL CYANIDE	0.005	mg/L	ND	12-16-98	SW 9010
SULFATE	200	mg/L	346	12-22-98	EPA 375.4
METALS					
CADMIUM	0.005	mg/L	ND	12-11-98	SW 6010
CHROMIUM	0.005	mg/L	ND	12-11-98	SW 6010
HEXAVALENT CHROMIUM	0.05	mg/L	ND	12-10-98	SW 7196
IRON	0.05	mg/L	11.7	12-21-98	SW 6010
LEAD	0.002	mg/L	ND	12-16-98	SW 6010
MANGANESE	0.005	mg/L	1.22	12-16-98	SW 6010
MERCURY	0.0002	mg/L	ND	12-17-98	SW 7470
NICKEL	0.005	mg/L	ND	12-16-98	SW 6010
ZINC	0.010	mg/L	ND	12-16-98	SW 6010

mg/L = PARTS PER MILLION (PPM)

ND = NOT DETECTED ABOVE REPORTING LIMIT



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CLIENT: O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY, SUITE 211
ST. LOUIS, MO 63128
ATTN: WILLIAM E. WRIGHT

REPORT: 2487501MT(706)

DATE : 12-23-98

QA/QC

<u>DESCRIPTION</u>		<u>PARAMETER</u>	<u>RESULTS</u>	
METHOD BLANK	12-16-98	TOTAL CYANIDE	<0.005	mg/L
METHOD BLANK	12-22-98	SULFATE	<10	mg/L
METHOD BLANK	12-11-98	CADMIUM	<0.005	mg/L
METHOD BLANK	12-11-98	CHROMIUM	<0.005	mg/L
METHOD BLANK	12-10-98	HEXAVALENT CHROMIUM	<0.05	mg/L
METHOD BLANK	12-21-98	IRON	<0.05	mg/L
METHOD BLANK	12-15-98	LEAD	<0.005	mg/L
METHOD BLANK	12-15-98	MANGANESE	<0.005	mg/L
METHOD BLANK	12-17-98	MERCURY	<0.0002	mg/L
METHOD BLANK	12-15-98	NICKEL	<0.010	mg/L
METHOD BLANK	12-15-98	ZINC	<0.010	mg/L
CONTROL SPIKE	12-16-98	TOTAL CYANIDE	87 %	RECOVERY
CONTROL SPIKE	12-22-98	SULFATE	101 %	RECOVERY
CONTROL SPIKE	12-11-98	CADMIUM	99 %	RECOVERY
CONTROL SPIKE	12-11-98	CHROMIUM	100 %	RECOVERY
CONTROL SPIKE	12-10-98	HEXAVALENT CHROMIUM	100 %	RECOVERY
CONTROL SPIKE	12-21-98	IRON	96 %	RECOVERY
CONTROL SPIKE	12-15-98	LEAD	98 %	RECOVERY
CONTROL SPIKE	12-15-98	MANGANESE	94 %	RECOVERY
CONTROL SPIKE	12-17-98	MERCURY	102 %	RECOVERY
CONTROL SPIKE	12-15-98	NICKEL	97 %	RECOVERY
CONTROL SPIKE	12-15-98	ZINC	96 %	RECOVERY

**O'BRIEN & GERE
ENGINEERS, INC.**

Office: St. Louis, MO

Address: 5000 Cedar Plaza Parkway

Phone: (314) 842-4550

Job No. 3050.005

Sheet 2 of 2

CHAIN OF CUSTODY

Client: INLAND REALTY CO Location: MARYVILLE, MISSOURI			Collected By: (Signature) <i>William E. Wright</i>				
SAMPLE DESCRIPTION	Date	Time	Sample Matrix ¹	Sample Type ²	No. of Containers ³	ANALYSIS REQUESTED	
GMW #475 <i>24870.01</i>	12/10/98	1330	Water	Grab	1-P, 500 mL	Cyanide (CN)	
GMW #475	12/10/98	1330	Water	Grab	1-P, 500 mL	Total lead (Pb) and zinc (Zn)	
GMW #475	12/10/98	1330	Water	Grab	1-P, 500 mL	Hexavalent chromium (Cr ^{VI}), <i>Sulfate</i>	
GMW #475	12/10/98	1330	Water	Grab	1-P, 1 L	Total Metals-Cd, Cr, mercury (Hg), manganese (Mn), Nickel (Ni), <i>Fe</i>	
GMW #55	12/10/98	1145	Water	Grab	1-P, 500 mL	CN	
GMW #55	12/10/98	1145	Water	Grab	1-P, 500 mL	Total Pb and Zn	
GMW #55	12/10/98	1145	Water	Grab	1-P, 500 mL	Cr ^{VI} , <i>Sulfates</i>	
GMW #55	12/10/98	1145	Water	Grab	1-P, 1 L	Total Metals-Cd, Cr, Hg, Mn, Ni, <i>Fe</i>	
GMW #5D	12/10/98	1230	Water	Grab	1-P, 500 mL	CN	
GMW #5D	12/10/98	1230	Water	Grab	1-P, 500 mL	Total Pb and Zn	
GMW #5D	12/10/98	1230	Water	Grab	1-P, 500 mL	Cr ^{VI} , <i>Sulfates</i>	
GMW #5D	12/10/98	1230	Water	Grab	1-P, 1 L	Total Metals-Cd, Cr, Hg, Mn, Ni, <i>Fe</i>	

Maximum Method Detection Limits: CN, Cd, Cr, Mn, Ni - 5 ppb; Pb - 2 ppb; Hg - 0.2 ppb; Zn - 10 ppb

¹Matrix = water, wastewater, air, sludge, sediment, etc.

²Type = grab, composite

³Containers = P - polyethylene; G - glass

Chemical Preservatives:

Metals - HNO₃ to pH 2

Cyanide - NaOH to pH 12

Cr VI - 17011e

Sulfates - none

Relinquished by: _____	Date	Time	Received by: <i>William E. Wright</i>	Date	Time
of: _____			of: <i>ATAS</i>	12-11-98	0850
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		
Use this space if shipped via courier (e.g., Fed Ex) Relinquished by: <i>William E. Wright</i>	Date	Time	Courier Name: <i>Fed Ex</i>	Date	Time
of: <i>O'Brien & Gere</i>	12/10/98	1645	0719801994 *Attach delivery/courier receipt to Chain of Custody		
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		

Phone: (314) 842-4550

Sheet ~~4~~ of ~~5~~

CHAIN OF CUSTODY

Sulfates - none

Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		
Use this space if shipped via courier (e.g., Fed Ex) Relinquished by: _____	Date	Time	Courier Name: _____	Date	Time
of: _____			of: _____		
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		

Phone: (314) 842-4550

Sheet 4 of 4

Client: INLAND REALTY CO
Location: MARYVILLE, MISSOURI

Collected By:
(Signature)

Sample	No. of	by: <i>William E. Hight</i>
--------	--------	-----------------------------

Maximum Method Detection Limits: CN, Cd, Cr, Mn, Ni - 5 ppb; Pb - 2 ppb; Hg - 0.2 ppb; Zn - 10 ppb

³Containers = P - polyethylene; G - glass

Sulfates - none

Relinquished by: _____ of: _____	Date _____ _____	Time _____ _____	Received by: _____ of: _____	Date _____ _____	Time _____ _____
Relinquished by: _____ of: _____	Date _____ _____	Time _____ _____	Received by: _____ of: _____	Date _____ _____	Time _____ _____
Relinquished by: _____ of: _____	Date _____ _____	Time _____ _____	Received by: _____ of: _____	Date _____ _____	Time _____ _____
Use this space if shipped via courier (e.g., Fed Ex) Relinquished by: _____ of: _____	Date _____ _____	Time _____ _____	Courier Name: _____ _____ *Attach delivery/courier receipt to Chain of Custody	Date _____ _____	Time _____ _____
Relinquished by: _____ of: _____	Date _____ _____	Time _____ _____	Received by: _____ of: _____	Date _____ _____	Time _____ _____

hone: (314) 842-4550

Sheet 1 of 2

CHAIN OF CUSTODY

Relinquished		Date	Time	Received by:-	Date	Time
				of:		
Relinquished		Date	Time	Received by:	Date	Time
f:				of:		
Relinquished		Date	Time	Received by:	Date	Time
f:				of:		
Relinquished		Date	Time	Received by:	Date	Time
f:				of:		
Use this space if shipped via courier (e.g., Fed Ex)		Date	Time	Courier Name:	Date	Time
Relinquished						
William E. Wright		12/9/88	1845	0719801983	12/9/88	1845
Brenda Lee				*Attach delivery/courier receipt to Chain of Custody		
Relinquished		Date	Time	Received by:	Date	Time
				of:		

O'BRIEN & GERE
ENGINEERS, INC.
Office: St. Louis, MO

Address: 5000 Cedar Plaza Parkway

Phone: (314) 842-4550

Job No. 3050.002

Sheet 2 of 2

CHAIN OF CUSTODY

Client: INLAND REALTY CO Location: MARYVILLE, MISSOURI				Collected By: (Signature)			
SAMPLE DESCRIPTION	Date	Time	Sample Matrix ¹	Sample Type ²	No. of Containers ³	ANALYSIS REQUESTED	
GMW #3S ¹²⁻¹⁰⁻⁹⁸ 24875.04	12/9/98	1345	Water	Grab	1-P, 500 mL	Cyanide (CN)	
GMW #3S	12/9/98	1345	Water	Grab	1-P, 500 mL	Total lead (Pb) and zinc (Zn)	
GMW #3S	12/9/98	1345	Water	Grab	1-P, 500 mL	Hexavalent chromium (Cr ^{VI}), <i>Sulfates</i>	
GMW #3S	12/9/98	1345	Water	Grab	1-P, 1 L	Total Metals-Cd, Cr, mercury (Hg), manganese (Mn), Nickel (Ni), <i>Fe</i>	
GMW #3D 05	12/9/98	1430	Water	Grab	1-P, 500 mL	CN	
GMW #3D	12/9/98	1430	Water	Grab	1-P, 500 mL	Total Pb and Zn	
GMW #3D	12/9/98	1430	Water	Grab	1-P, 500 mL	Cr ^{VI} , <i>Sulfates</i>	
GMW #3D	12/9/98	1430	Water	Grab	1-P, 1 L	Total Metals-Cd, Cr, Hg, Mn, Ni, <i>Fe</i>	
GMW #4D 06	12/9/98	1545	Water	Grab	1-P, 500 mL	CN	
GMW #4D	12/9/98	1545	Water	Grab	1-P, 500 mL	Total Pb and Zn	
GMW #4D	12/9/98	1545	Water	Grab	1-P, 500 mL	Cr ^{VI} , <i>Sulfates</i>	
GMW #4D	12/9/98	1545	Water	Grab	1-P, 1 L	Total Metals-Cd, Cr, Hg, Mn, Ni, <i>Fe</i>	

Maximum Method Detection Limits: CN, Cd, Cr, Mn, Ni - 5 ppb; Pb - 2 ppb; Hg - 0.2 ppb; Zn - 10 ppb

¹Matrix = water, wastewater, air, sludge, sediment, etc.

²Type = grab, composite

³Containers = P - polyethylene; G - glass

Chemical Preservatives:

Metals - HNO₃ to pH 2

Cyanide - NaOH to pH 12

Cr VI - none

Sulfates - none

Relinquished by: _____	Date	Time	Received by: <i>J. Markey</i>	Date	Time
of: _____			of: <i>ATAS</i> 50	12/10/98	0902
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		
Use this space if shipped via courier (e.g., Fed Ex) Relinquished by: <i>William E. Wright</i>	Date	Time	Courier Name: <i>Fed Ex</i>	Date	Time
of: <i>O'Brien & Gere Engineers</i>	12/9/98	1845	0719801983 *Attach delivery/courier receipt to Chain of Custody	12/9/98	1845
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		

O'Brien & Gere Laboratories, Inc.

Analytical Results Trace Metals

Client: O'Brien & Gere Engineers, Inc.
Project: Inland Realty Co.
Proj. Desc: Maryville, Missouri

Job No.: 3435.016.015
Certification NY No.: 10155R

Sample: K1931
Samp. Description: GMW #3DA
Units: mg/L

Collected: 12/09/98
Received: 12/10/98
Matrix: Water
%Solids:
Number of analytes: 8

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Cadmium	<.005	200.7	12/16/98	12/18/98	121698W1	1	
Chromium	.005	200.7	12/16/98	12/18/98	121698W1	1	
Iron	7.1	200.7	12/16/98	12/18/98	121698W1	1	
Lead	<.002	200.9	12/16/98	12/28/98	121698W1	1	
Manganese	.53	200.7	12/16/98	12/18/98	121698W1	1	
Mercury	<.0002	245.1	12/14/98	12/14/98	121498W1	1	
Nickel	<.005	200.7	12/16/98	12/18/98	121698W1	1	
Zinc	.01	200.7	12/16/98	12/18/98	121698W1	1	

Notes:

J-Estimated value

Authorized: Monika Santucci

Date: December 28, 1998 Monika Santucci

O'Brien & Gere Laboratories, Inc.

Analytical Results Wet Chemistry

Client: O'Brien & Gere Engineers, Inc.
Project: Inland Realty Co.
Proj. Desc: Maryville, Missouri

Job No.: 3435.016.015
Certification NY No.: 10155R

Sample: K1931
Samp. Description: GMW #3DA

Collected: 12/09/98 14:30 Matrix: Water
Received: 12/10/98 08:50

Parameter	Result Units	Method	Prepared Analyzed	QC Batch	Note
Chromium-Hexavalent	<.01 mg/L	7196A	12/10/98	121098W23	
Sulfate	140. mg/L	EPA 375.4	12/28/98	122898W23	
Total cyanide	<.005 mg/L	EPA 335.2	12/16/98 12/16/98	121698W21	

Notes:

J-Estimated value

Authorized: Monika Santucci
Date: December 29, 1998 Monika Santucci

Phone: (314) 842-4550

CHAIN OF CUSTODY

0 1 1 100

**O'BRIEN & GERE
ENGINEERS, INC.**

Office: St. Louis, MO

Address: 5000 Cedar Plaza Parkway

Phone: (314) 842-4550

Job No. 3050.00

Sheet 1 of 2

CHAIN OF CUSTODY

Client: INLAND REALTY CO Location: MARYVILLE, MISSOURI				Collected By: (Signature)			
SAMPLE DESCRIPTION	Date	Time	Sample Matrix ¹	Sample Type ²	No. of Containers ³	ANALYSIS REQUESTED	
GMW #2S 24875.01	12/9/98	1040	Water	Grab	1-P, 500 mL	Cyanide (CN)	
GMW #2S	12/9/98	1040	Water	Grab	1-P, 500 mL	Total lead (Pb) and zinc (Zn)	
GMW #2S	12/9/98		Water	Grab	1-P, 500 mL	Hexavalent chromium (Cr ^{VI}), Sulfates	
GMW #2S	12/9/98	1040	Water	Grab	1-P, 1 L	Total Metals-Cd, Cr, mercury (Hg), manganese (Mn), Nickel (Ni), Iron (Fe)	
GMW #2D	12/9/98	0940	Water	Grab	1-P, 500 mL	CN	
GMW #2D	12/9/98	0940	Water	Grab	1-P, 500 mL	Total Pb and Zn	
GMW #2D	12/9/98	1240	Water	Grab	1-P, 500 mL	Cr ^{VI} / Sulfates	
GMW #2D	12/9/98	0940	Water	Grab	1-P, 1 L	Total Metals-Cd, Cr, Hg, Mn, Ni, Fe	
GMW #3	12/9/98	1215	Water	Grab	1-P, 500 mL	CN	
GMW #3	12/9/98	1215	Water	Grab	1-P, 500 mL	Total Pb and Zn	
GMW #3	12/9/98	1215	Water	Grab	1-P, 500 mL	Cr ^{VI} , Sulfates	
GMW #3	12/9/98	1215	Water	Grab	1-P, 1 L	Total Metals-Cd, Cr, Hg, Mn, Ni, Fe	

Maximum Method Detection Limits: CN, Cd, Cr, Mn, Ni - 5 ppb; Pb - 2 ppb; Hg - 0.2 ppb; Zn - 10 ppb

¹Matrix = water, wastewater, air, sludge, sediment, etc.

²Type = grab, composite

³Containers = P - polyethylene; G - glass

Chemical Preservatives:

Metals - HNO₃ to pH 2
Cyanide - NaOH to pH 12
Cr VI - None
Sulfates - None

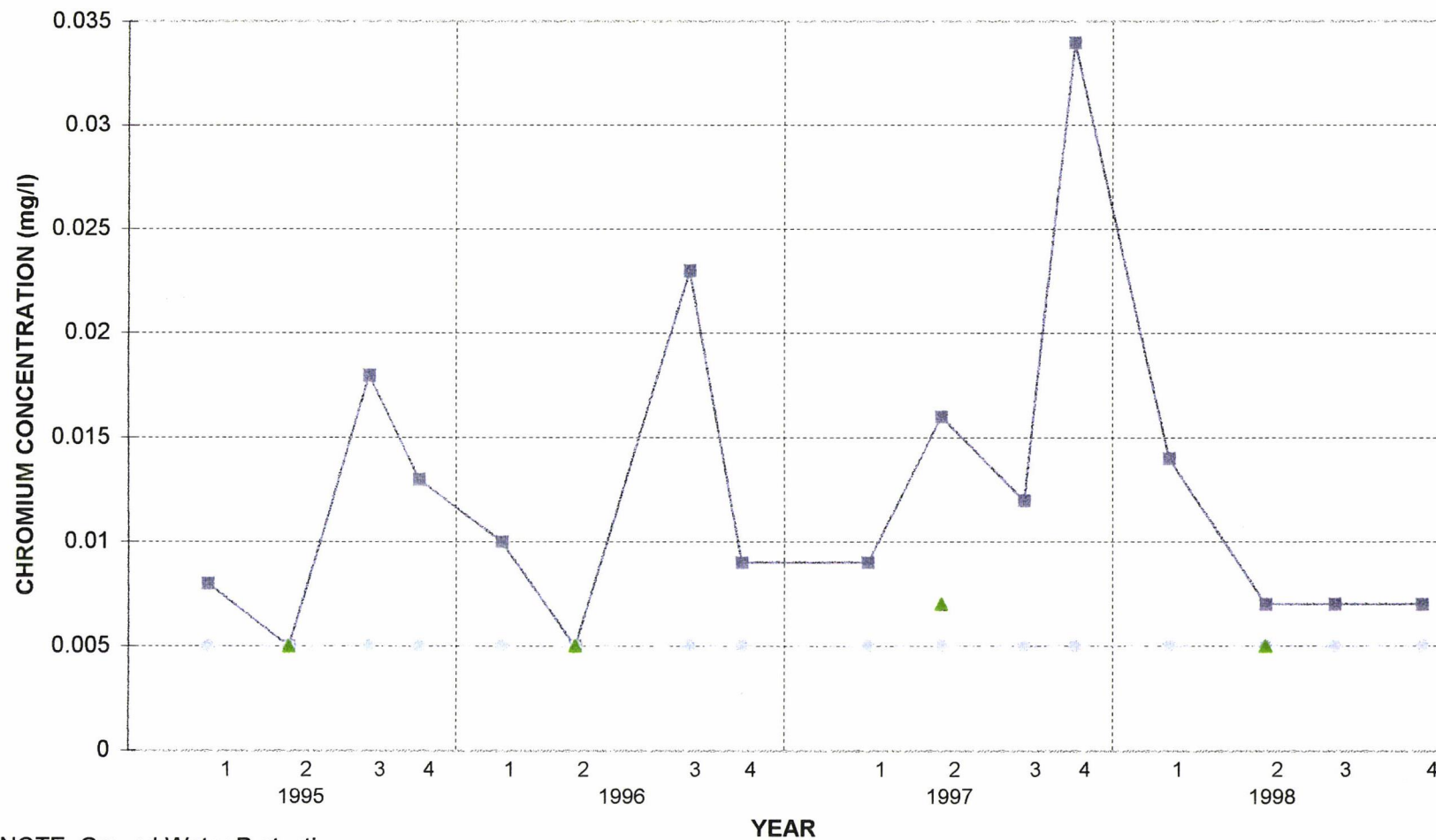
Relinquished by: _____	Date	Time	Received by: <u>F. W. Wrenley</u>	Date	Time
of: _____			of: <u>ATAS</u> <u>5c</u>	<u>12/9/98</u>	<u>0912</u>
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		
Use this space if shipped via courier (e.g., Fed Ex) Relinquished by: <u>William E. Bright</u>	Date	Time	Courier Name: <u>Fed Ex</u>	Date	Time
of: <u>O'Brien & Gere</u>	<u>12/9/98</u>	<u>1845</u>	<u>0719801983</u> *Attach delivery/courier receipt to Chain of Custody	<u>12/9/98</u>	<u>1845</u>
Relinquished by: _____	Date	Time	Received by: _____	Date	Time
of: _____			of: _____		

Appendix C

Concentration trend graphs 1995-1998

INLAND REALTY - MARYVILLE, MISSOURI

CHROMIUM CONCENTRATION - SHALLOW WELLS

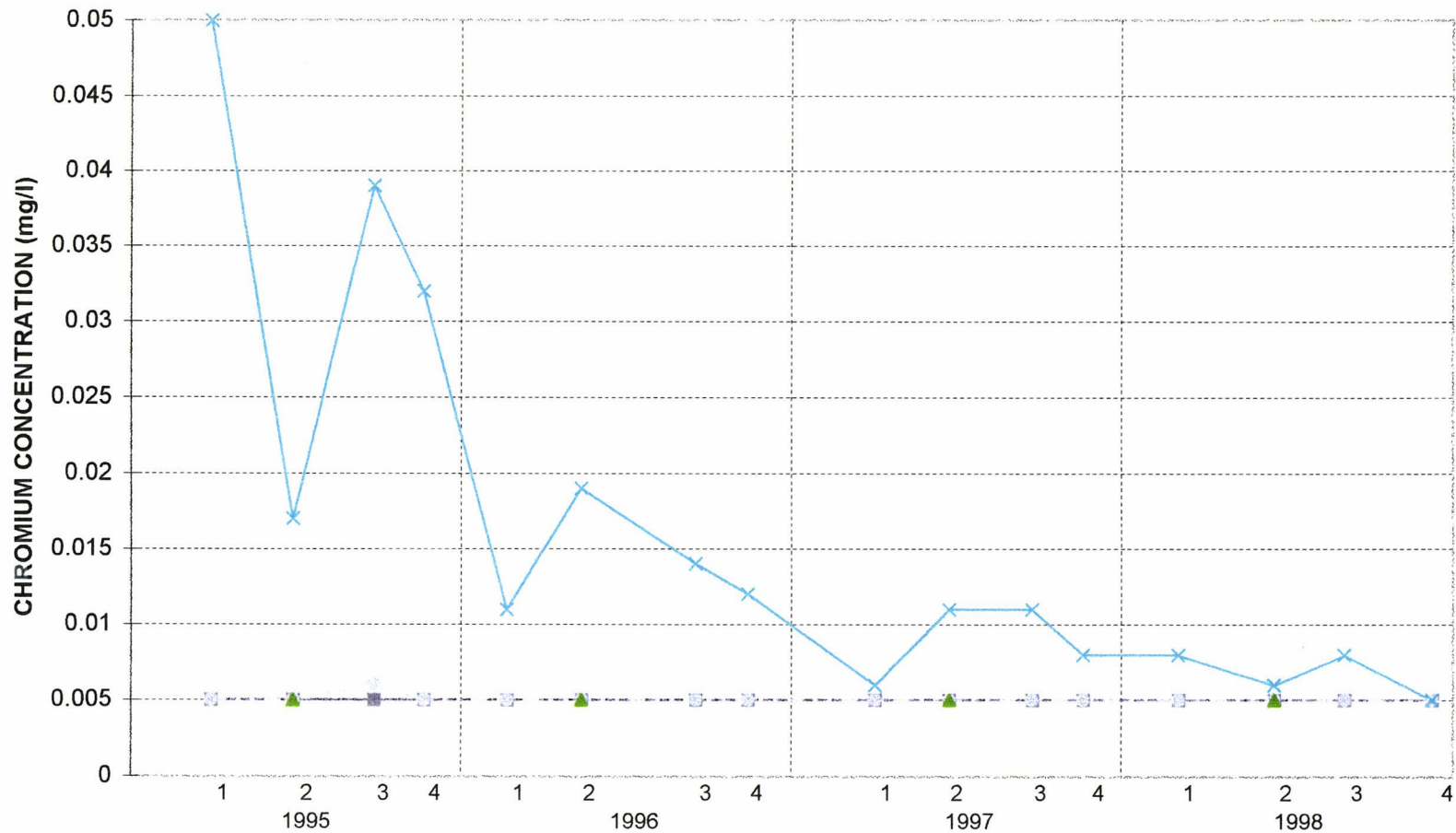


NOTE: Ground Water Protection
Standard - 49 mg/l

—■— GMW #4S - - - ○ - - - GMW #5S —▲— GMW #6S

INLAND REALTY - MARYVILLE, MISSOURI

CHROMIUM CONCENTRATION - DEEP WELLS

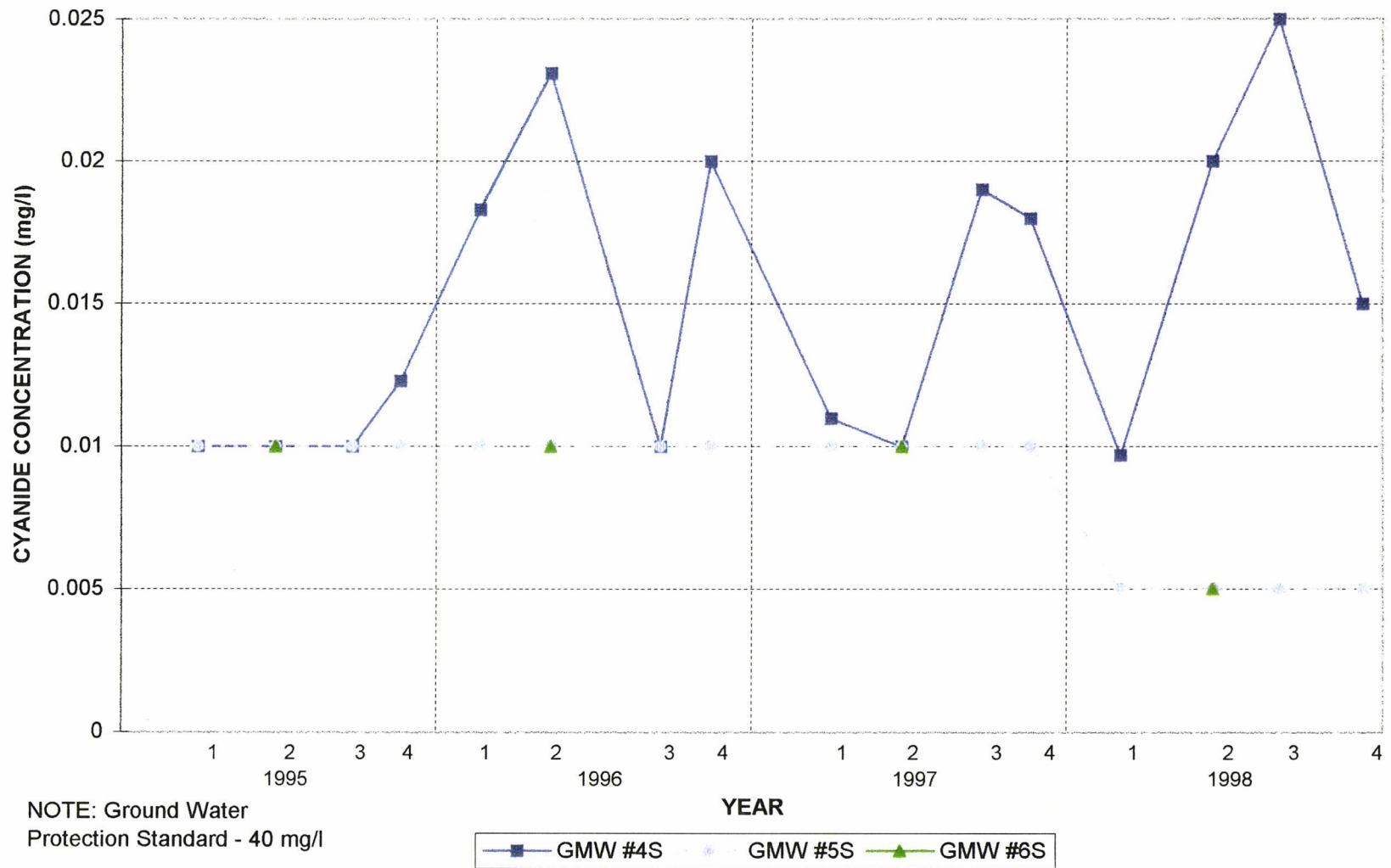


NOTE: Ground Water Protection
Standard - 49 mg/l

GMW #4D GMW #5D GMW #6 GMW #9

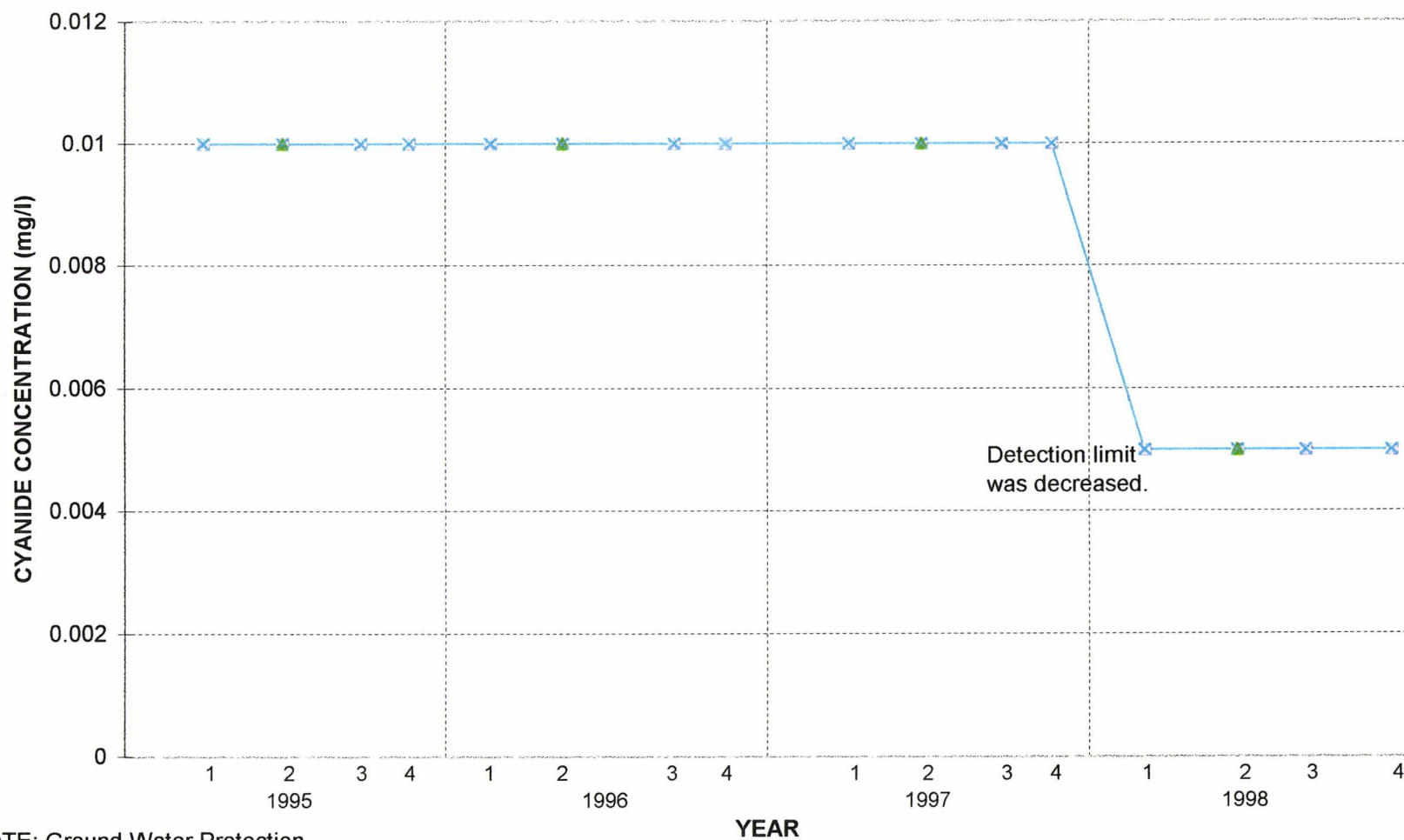
INLAND REALTY - MARYVILLE, MISSOURI

CYANIDE CONCENTRATION - SHALLOW WELLS



INLAND REALTY - MARYVILLE, MISSOURI

CYANIDE CONCENTRATION - DEEP WELLS

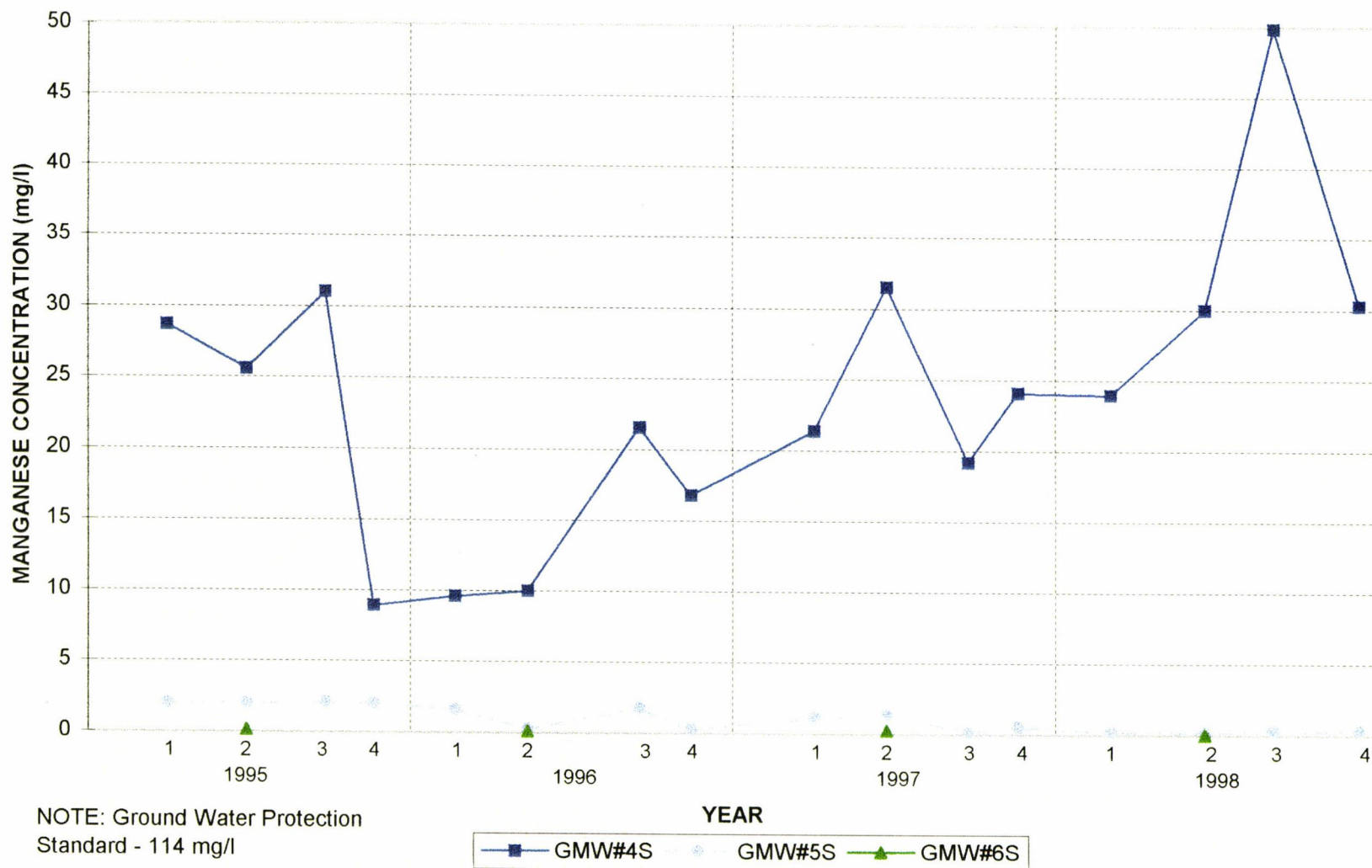


NOTE: Ground Water Protection
Standard - 40 mg/l

GMW #4D GMW #5D GMW #6D GMW #9

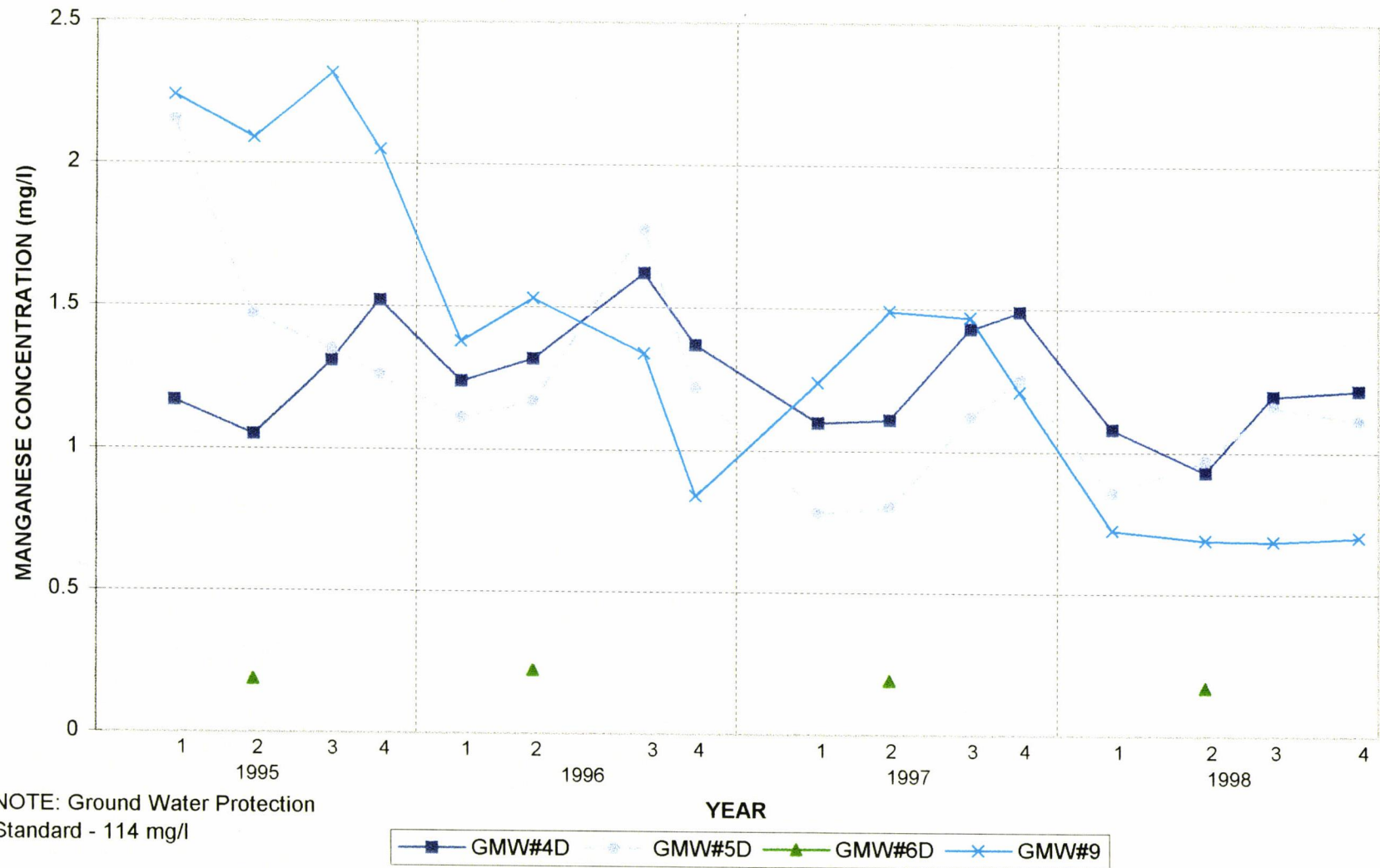
INLAND REALTY - MARYVILLE, MISSOURI

MANGANESE CONCENTRATION - SHALLOW WELLS



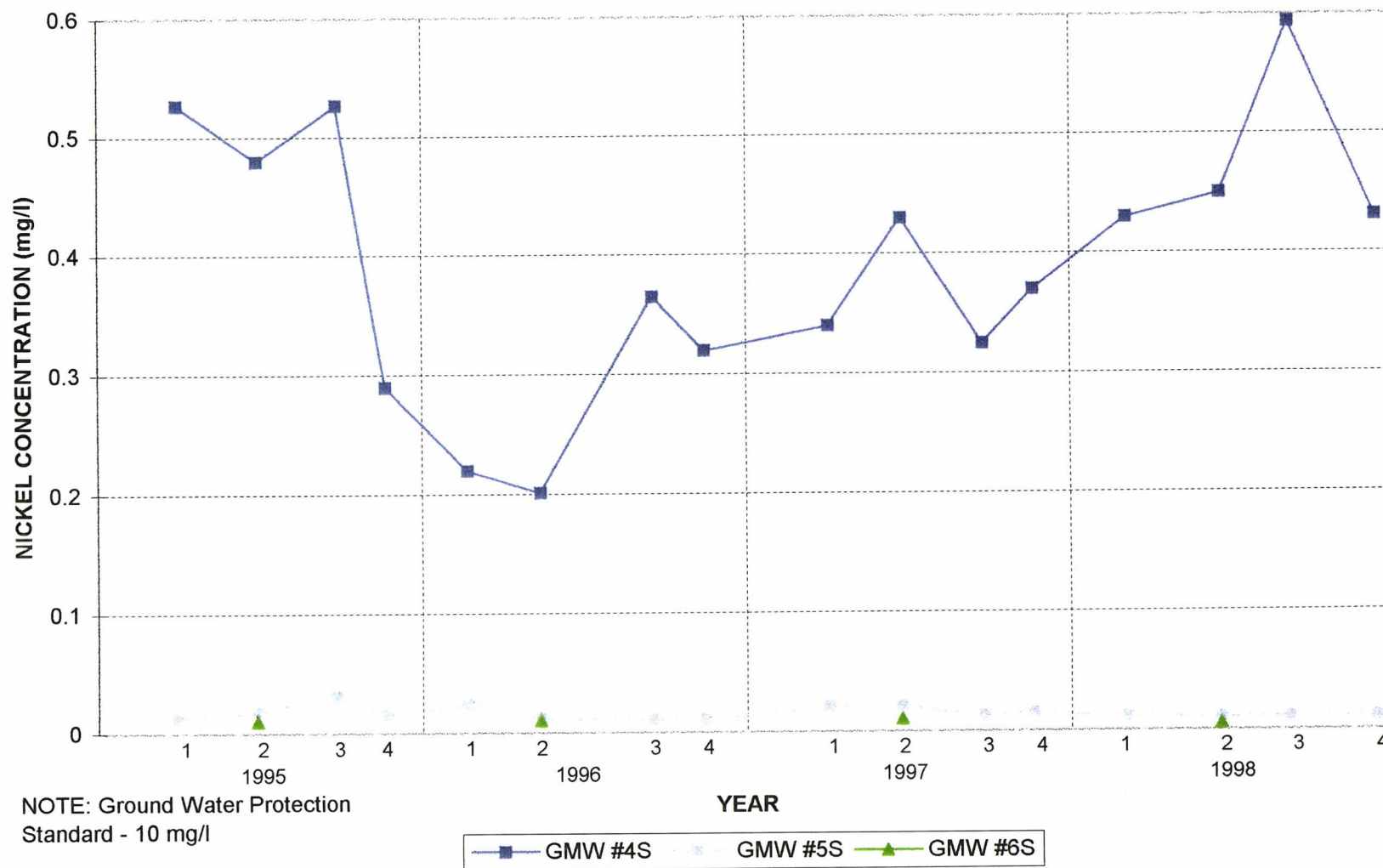
INLAND REALTY - MARYVILLE, MISSOURI

MANGANESE CONCENTRATION - DEEP WELLS



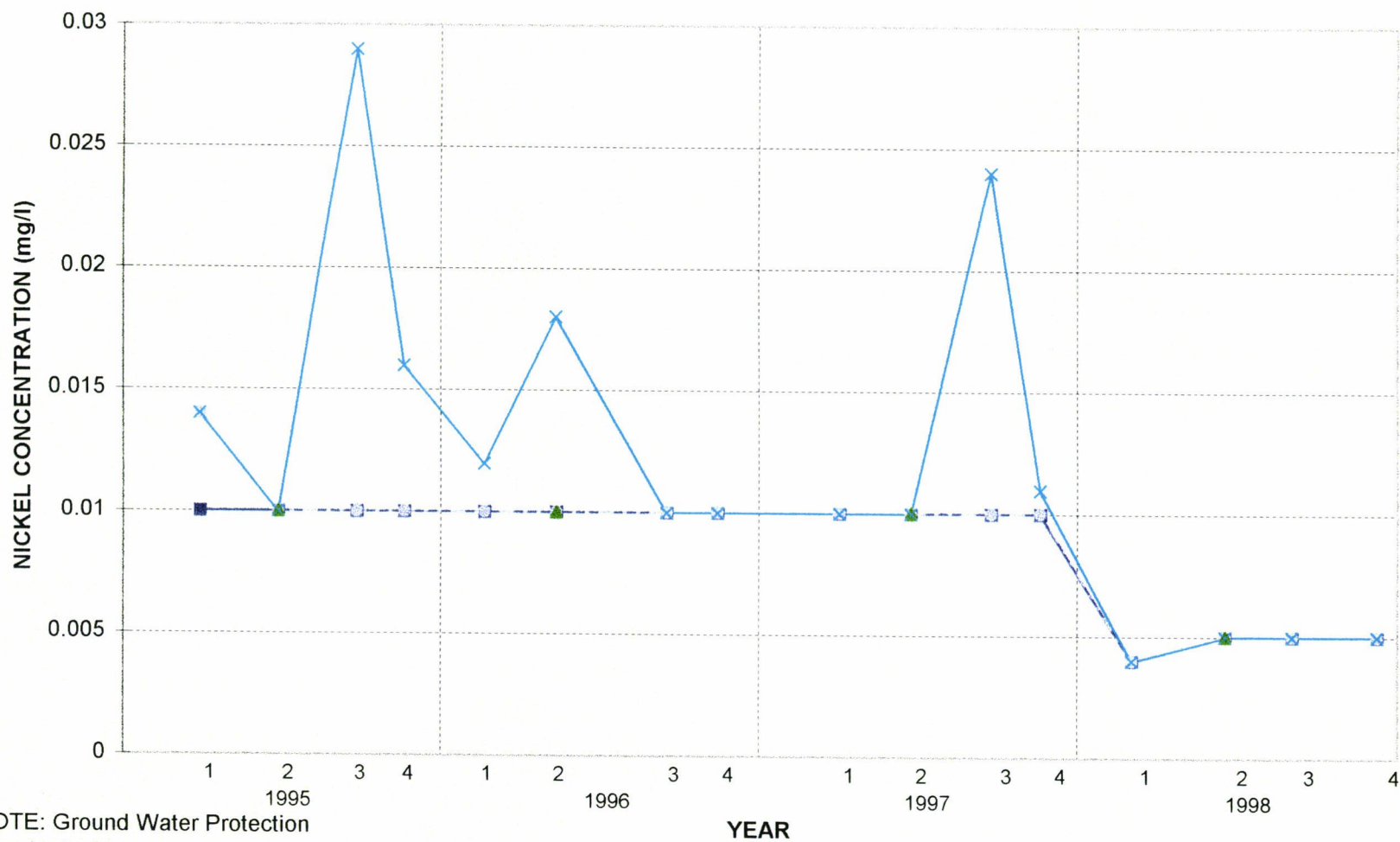
INLAND REALTY - MARYVILLE, MISSOURI

NICKEL CONCENTRATION - SHALLOW WELLS



INLAND REALTY - MARYVILLE, MISSOURI

NICKEL CONCENTRATION - DEEP WELLS

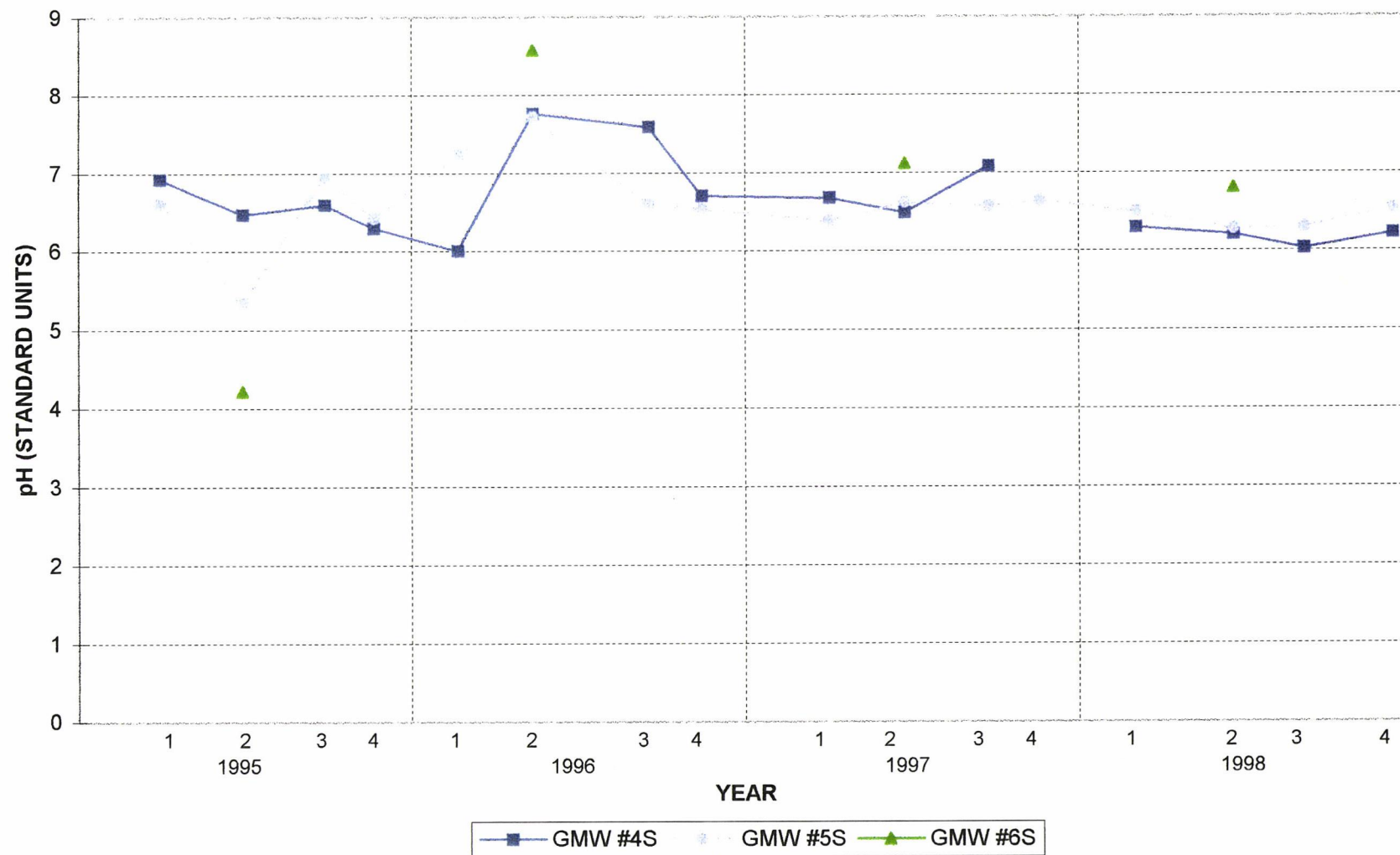


NOTE: Ground Water Protection
Standard - 10 mg/l

GMW #4D GMW #5D GMW #6D GMW #9

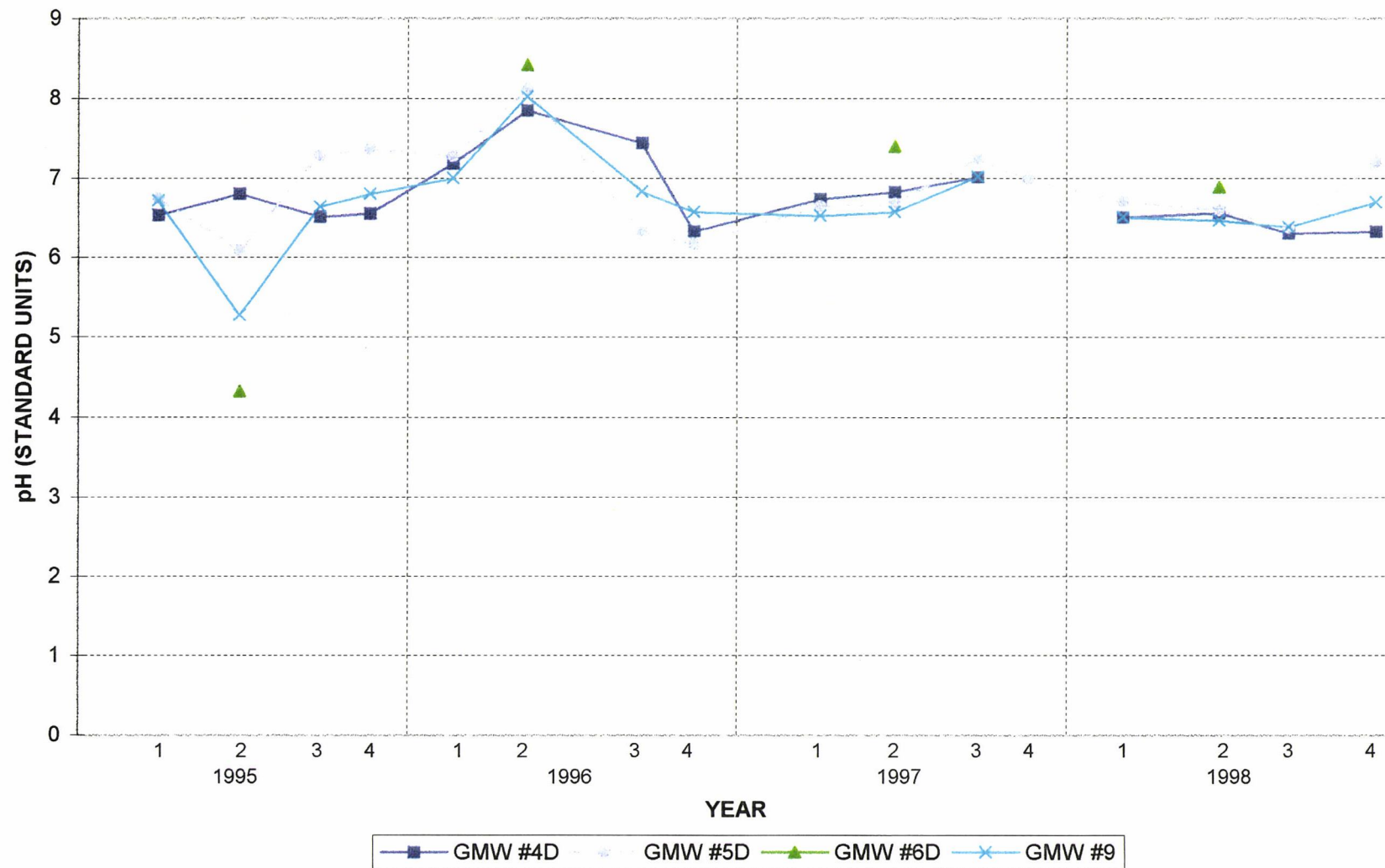
INLAND REALTY - MARYVILLE, MISSOURI

pH - SHALLOW WELLS



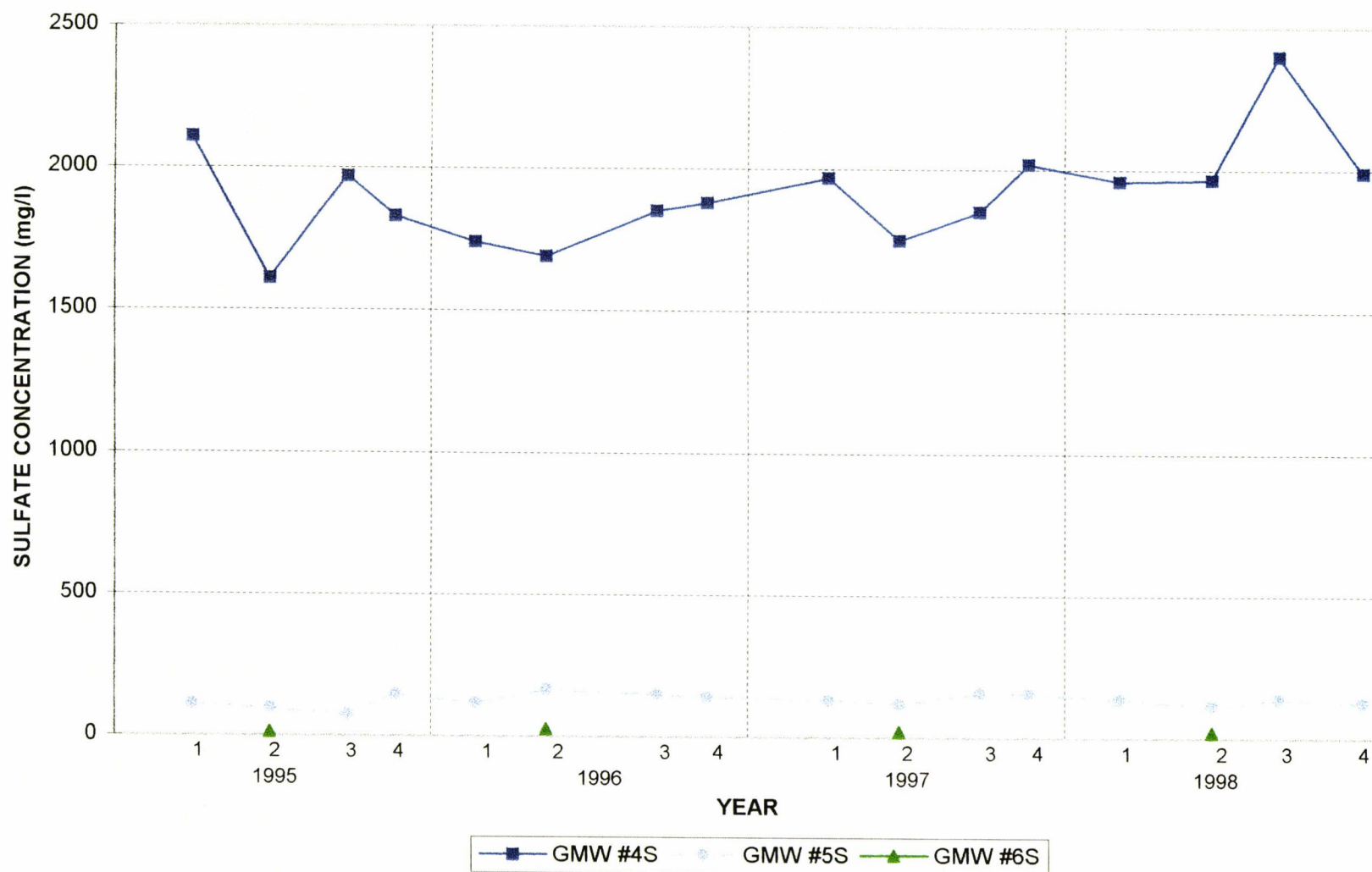
INLAND REALTY - MARYVILLE, MISSOURI

pH - DEEP WELLS



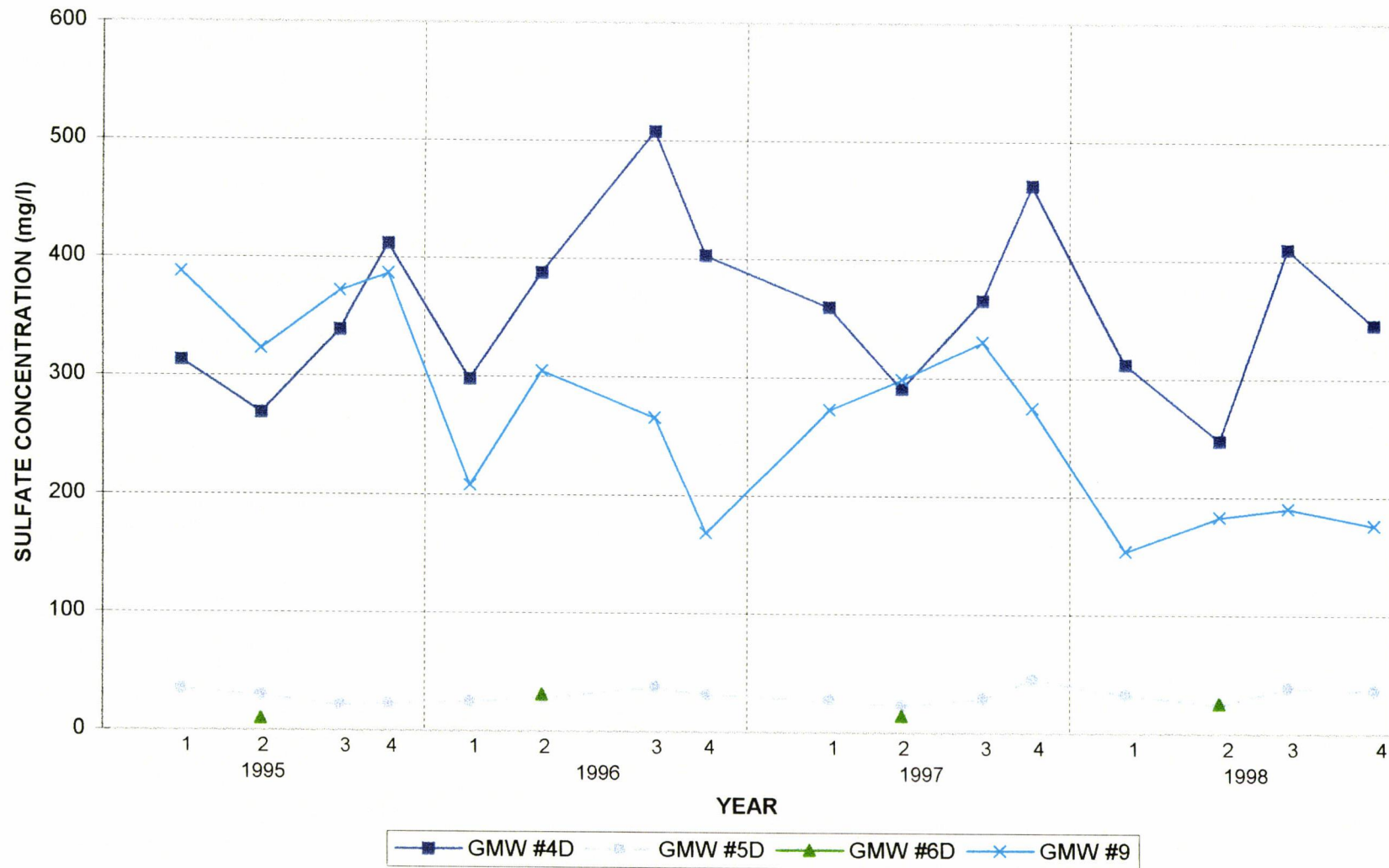
INLAND REALTY - MARYVILLE, MISSOURI

SULFATE CONCENTRATION - SHALLOW WELLS



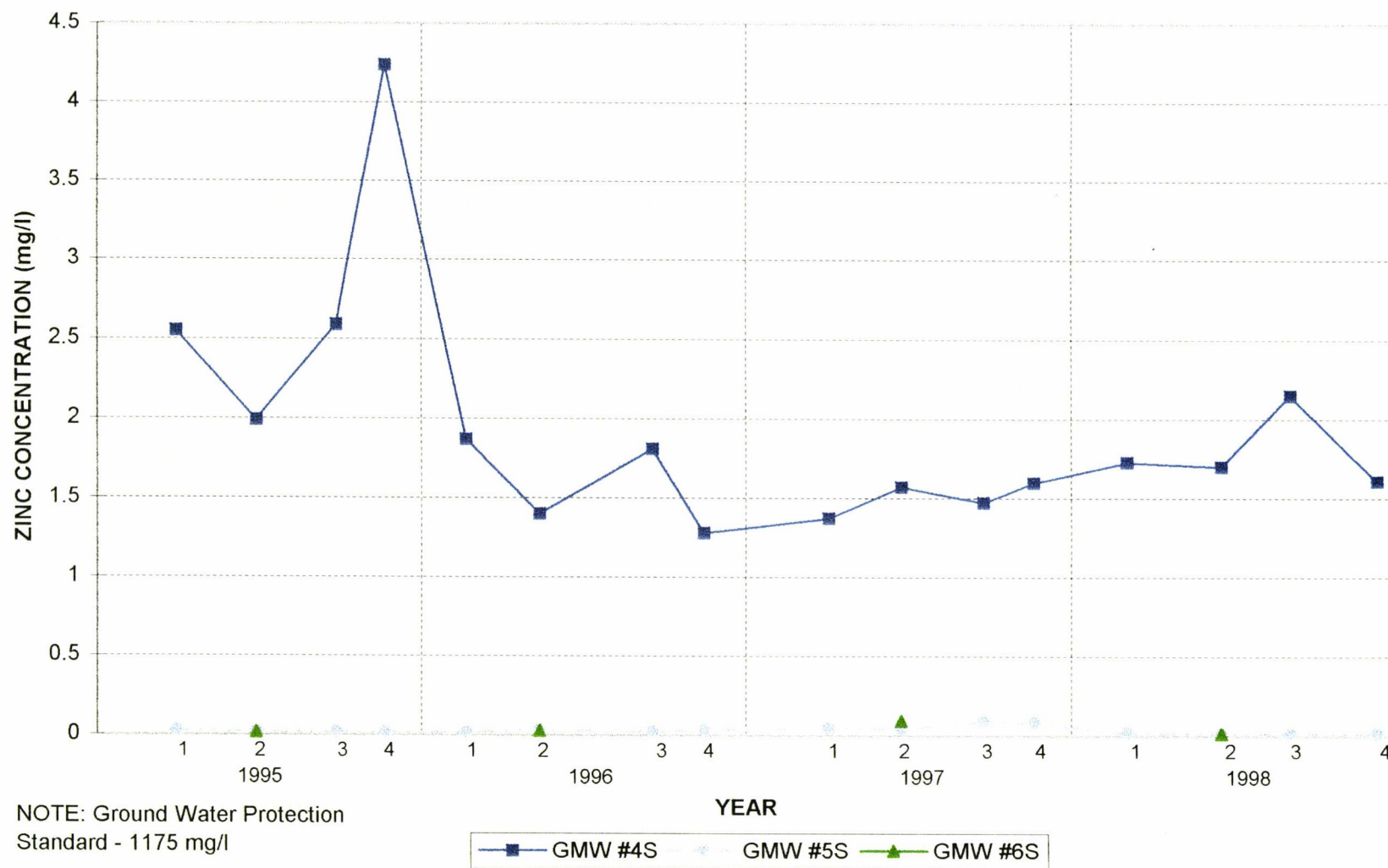
INLAND REALTY - MARYVILLE, MISSOURI

SULFATE CONCENTRATION - DEEP WELLS



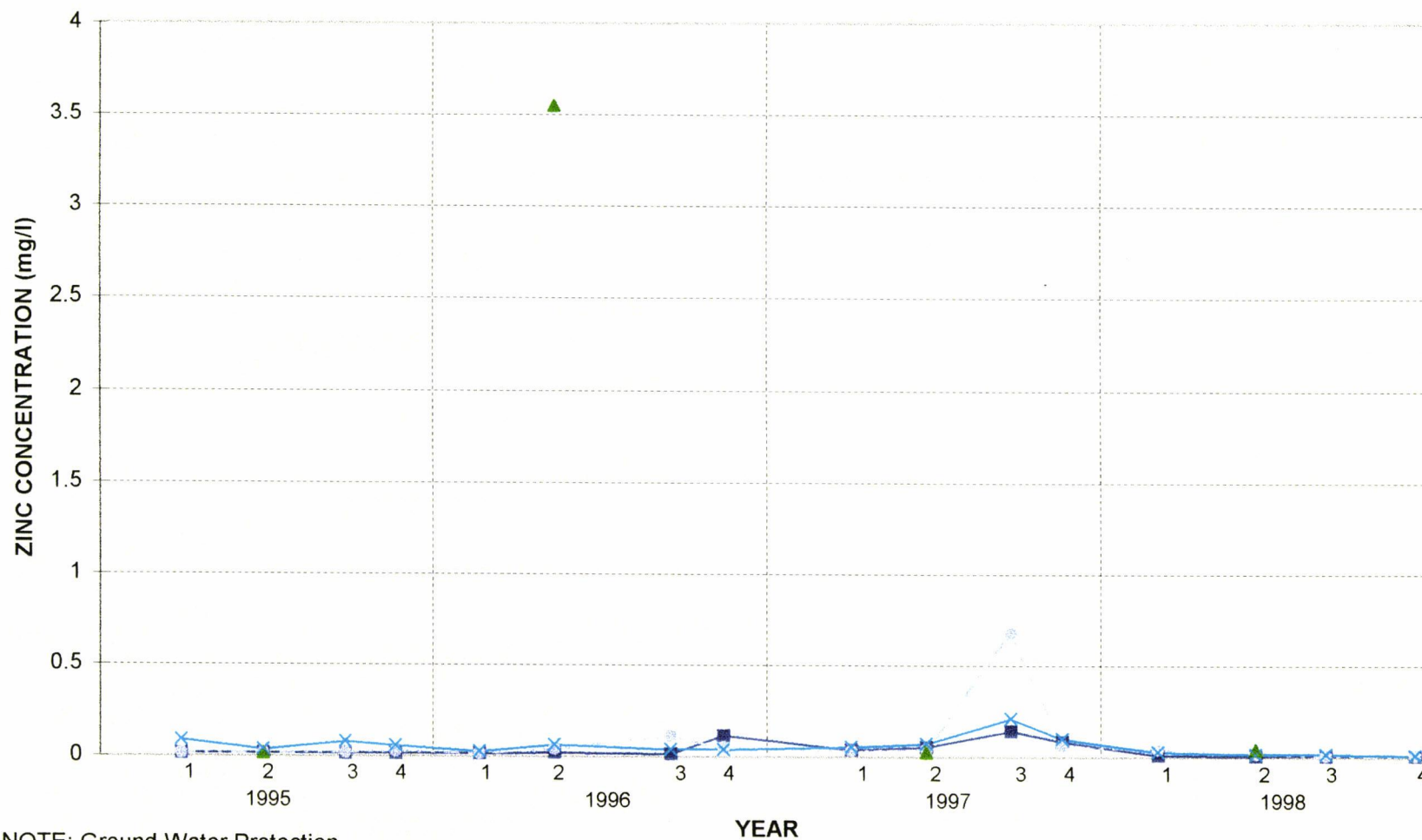
INLAND REALTY - MARYVILLE, MISSOURI

ZINC CONCENTRATION - SHALLOW WELLS



INLAND REALTY - MARYVILLE, MISSOURI

ZINC CONCENTRATION - DEEP WELLS



NOTE: Ground Water Protection
Standard - 1175 mg/l

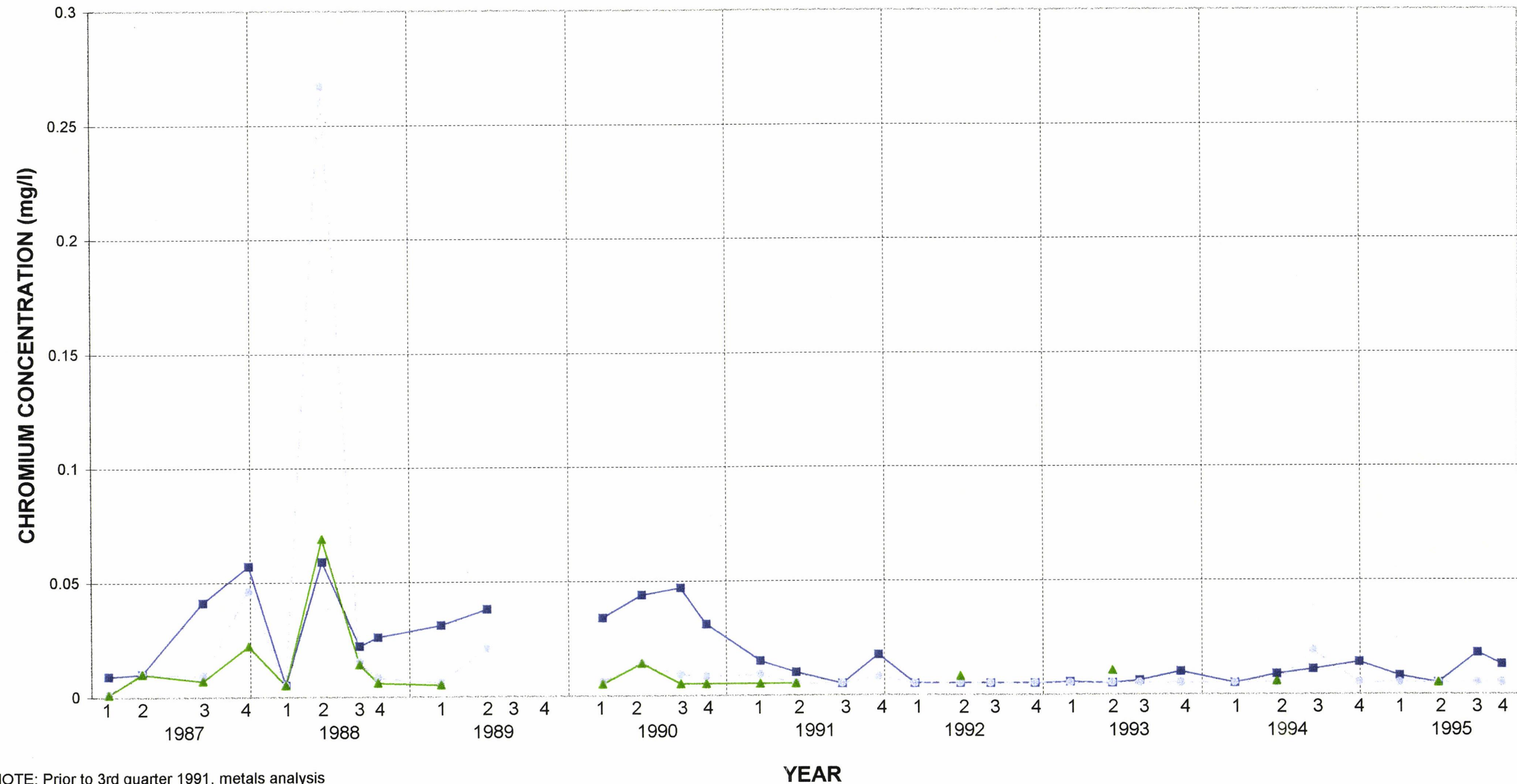
■ GMW #4D ● GMW #5D ▲ GMW #6D × GMW #9

Appendix D

Concentration trend graphs 1987-1995

INLAND REALTY - MARYVILLE, MISSOURI

CHROMIUM CONCENTRATION - SHALLOW WELLS

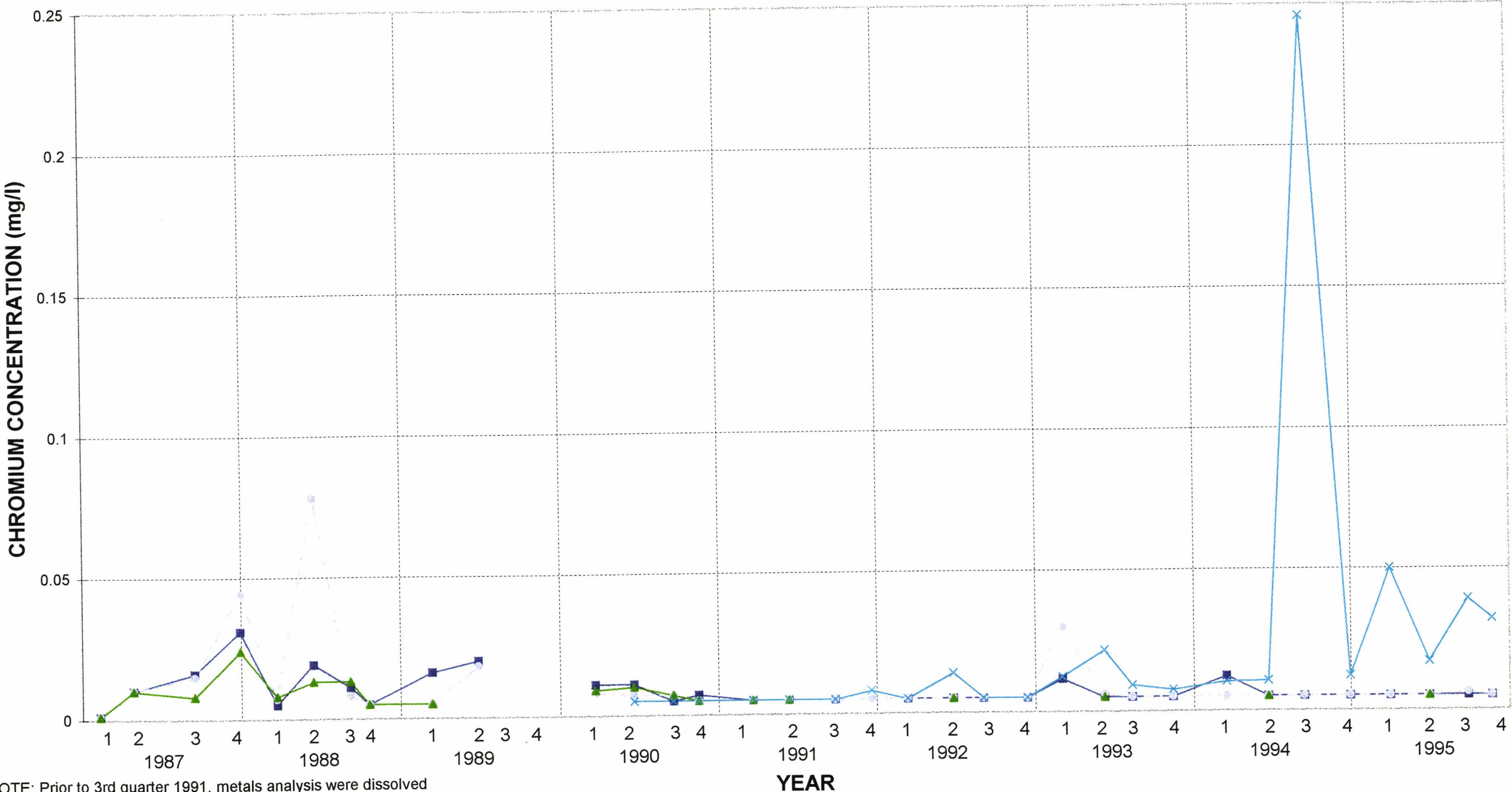


NOTE: Prior to 3rd quarter 1991, metals analysis were dissolved concentrations.
Ground Water Protection Standard - 49 mg/l

—■— GMW #4S —◆— GMW #5S —▲— GMW #6S

INLAND REALTY - MARYVILLE, MISSOURI

CHROMIUM CONCENTRATION - DEEP WELLS

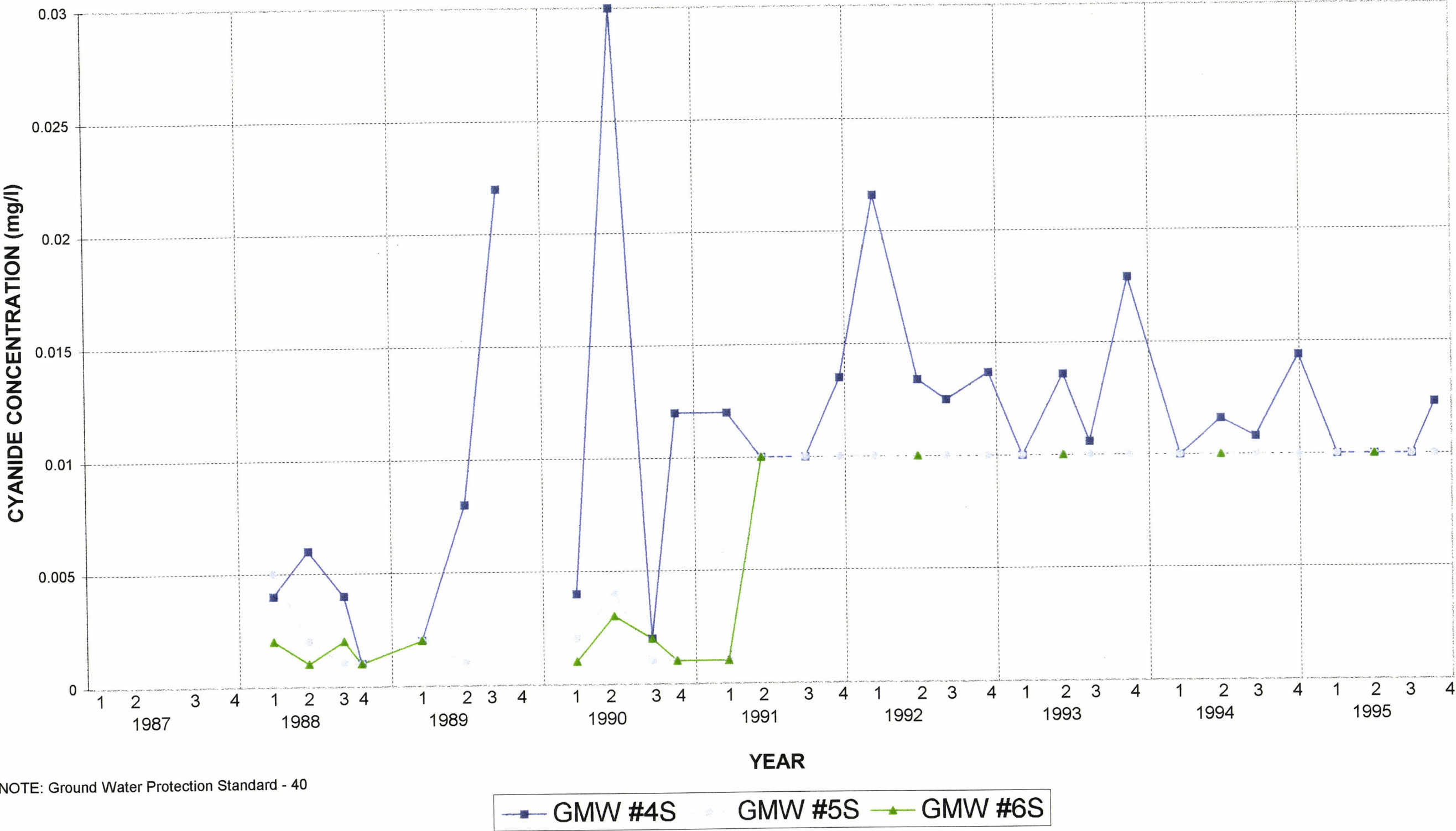


NOTE: Prior to 3rd quarter 1991, metals analysis were dissolved concentrations.
Ground Water Protection Standard - 49 mg/l

—■— GMW #4D - - - ● - - - GMW #5D —▲— GMW #6D —×— GMW #9

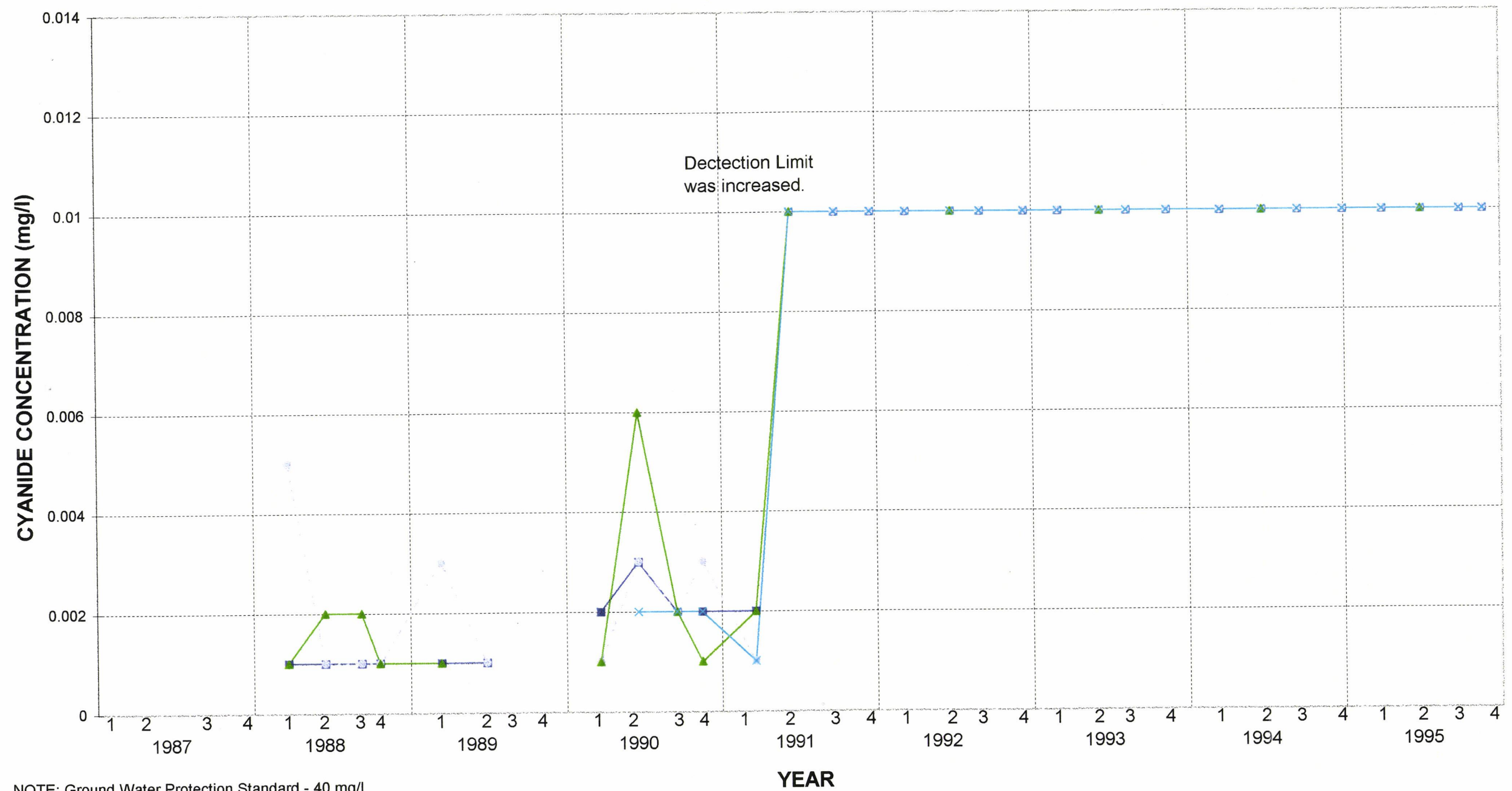
INLAND REALTY - MARYVILLE, MISSOURI

CYANIDE CONCENTRATION - SHALLOW WELLS



INLAND REALTY - MARYVILLE, MISSOURI

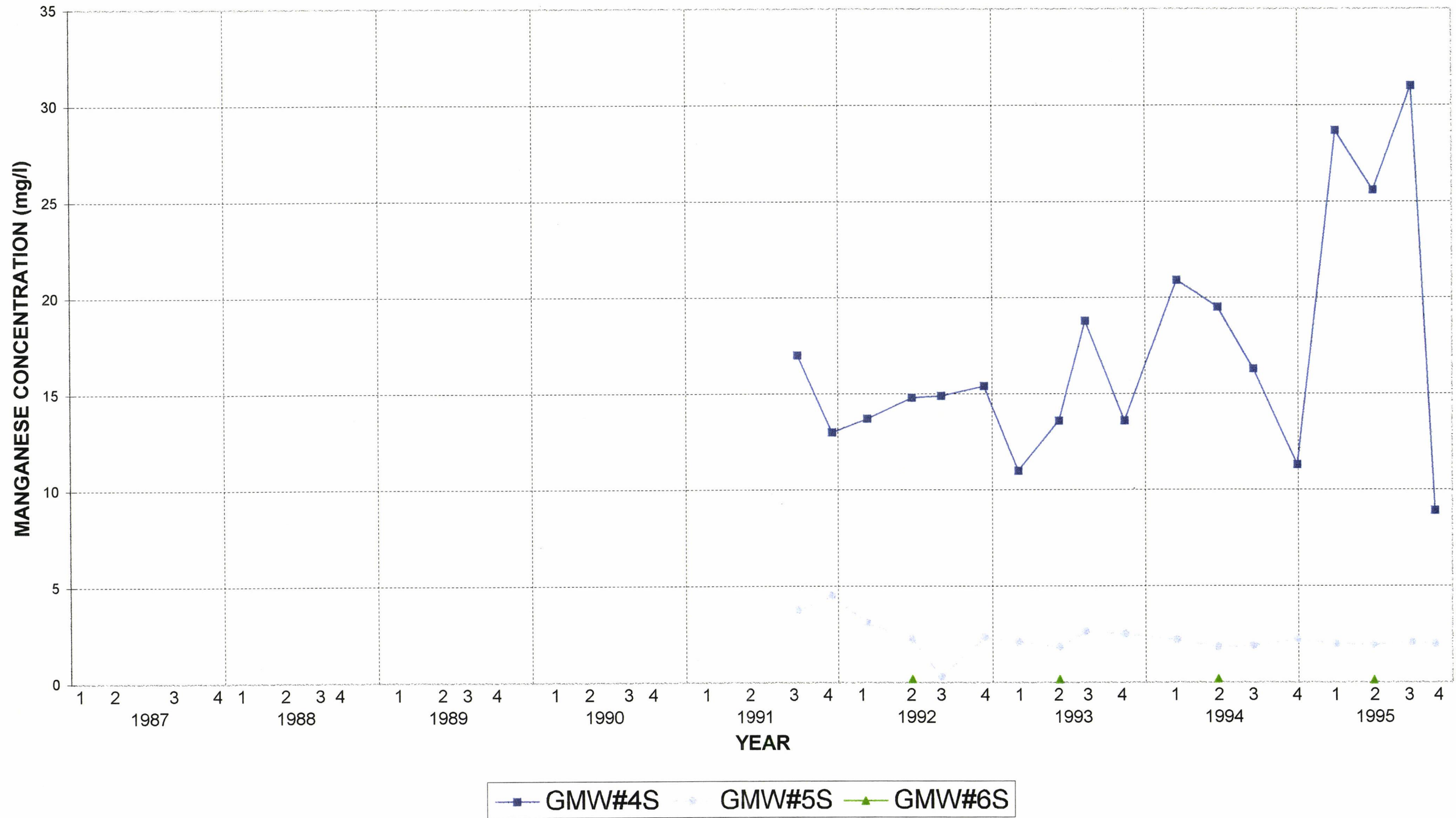
CYANIDE CONCENTRATION - DEEP WELLS



—■— GMW #4D - - - ■ - - GMW #5D —▲— GMW #6D —×— GMW #9

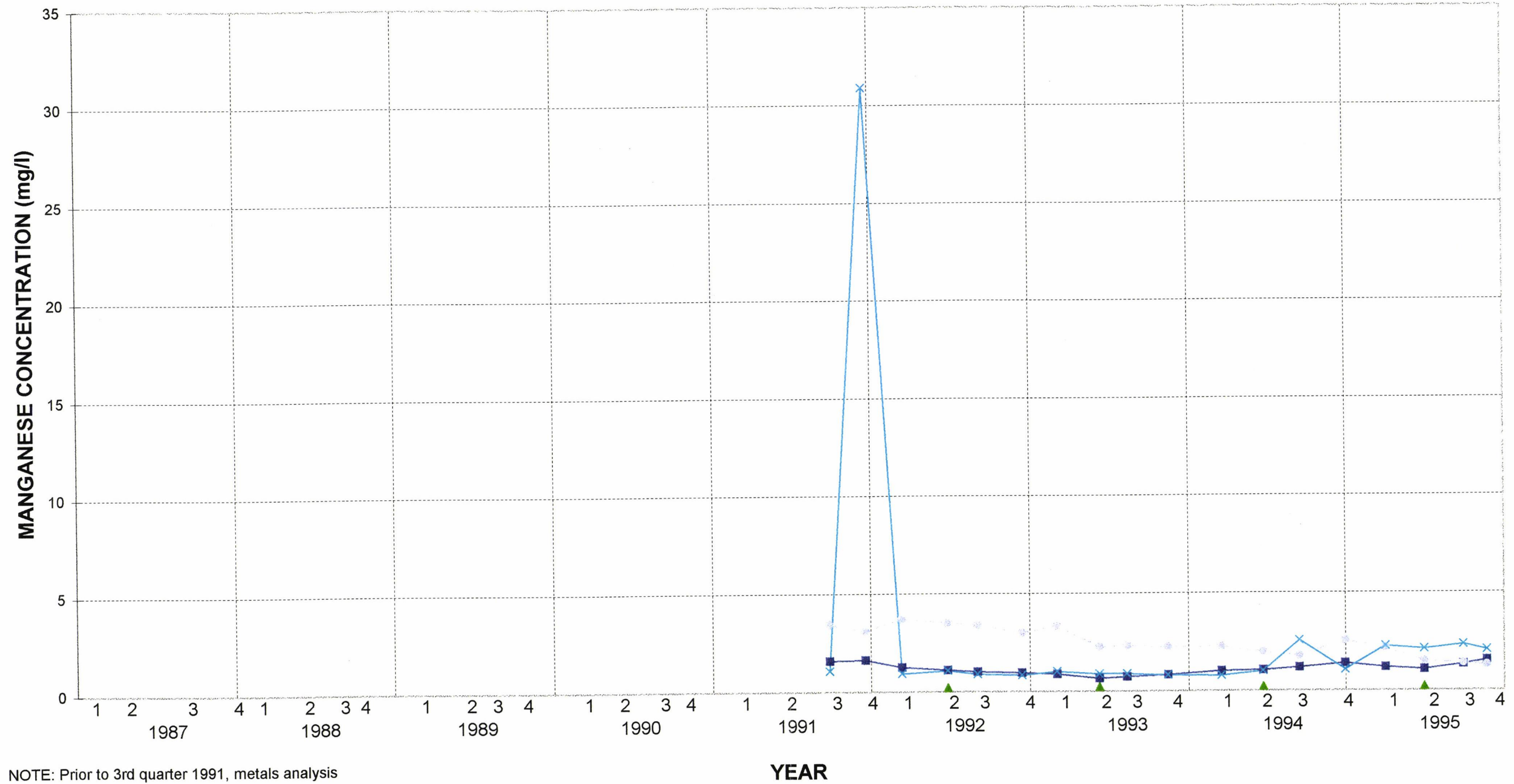
INLAND REALTY - MARYVILLE, MISSOURI

MANGANESE CONCENTRATION - SHALLOW WELLS



INLAND REALTY - MARYVILLE, MISSOURI

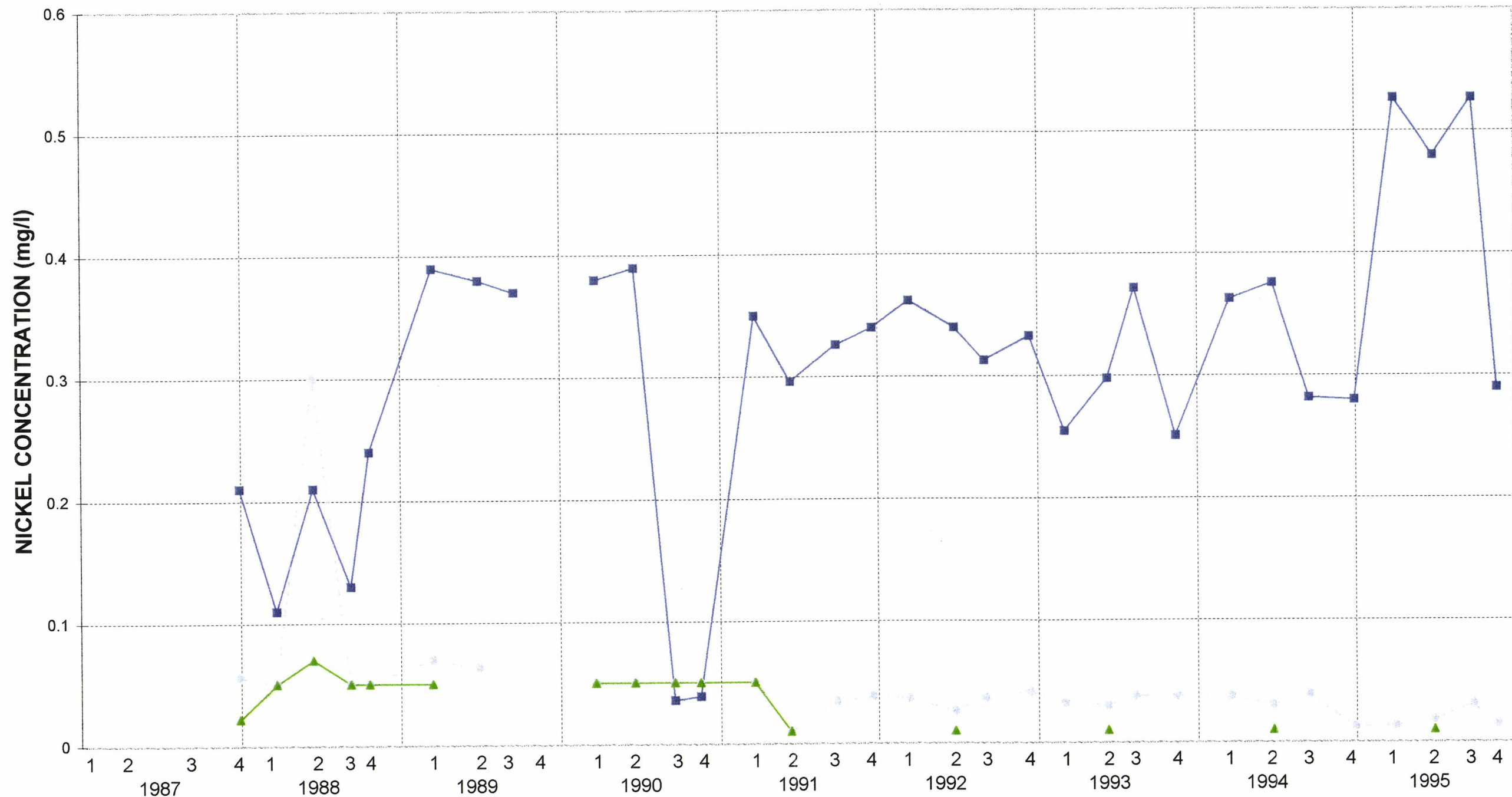
MANGANESE CONCENTRATION - DEEP WELLS



■ GMW#4D
 ● GMW#5D
 ▲ GMW#6D
 × GMW#9

INLAND REALTY - MARYVILLE, MISSOURI

NICKEL CONCENTRATION - SHALLOW WELLS

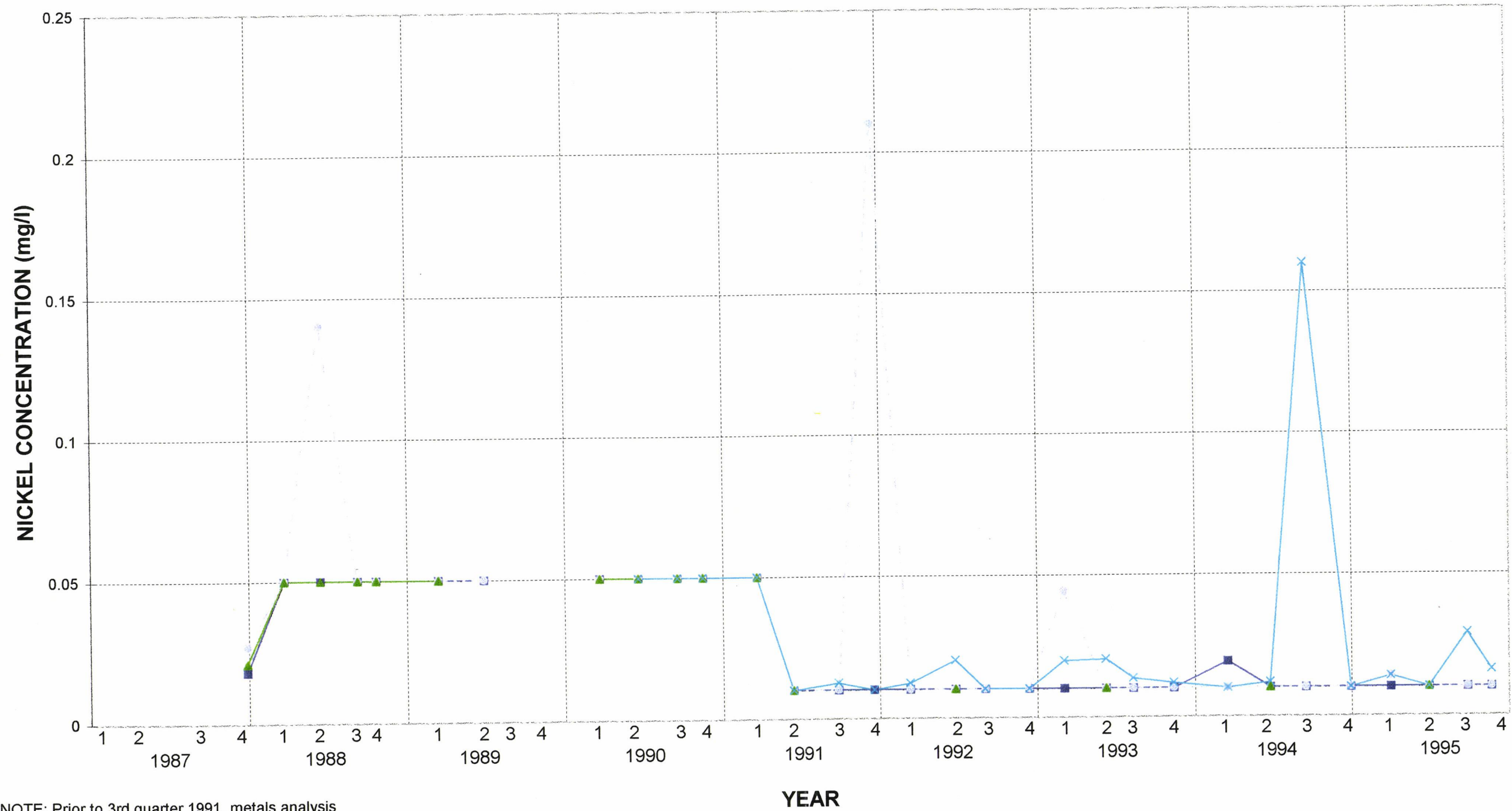


NOTE: Prior to 3rd quarter 1991, metals analysis were dissolved concentrations.
Ground Water Protection Standard - 10 mg/l

—■— GMW #4S —◆— GMW #5S —▲— GMW #6S

INLAND REALTY - MARYVILLE, MISSOURI

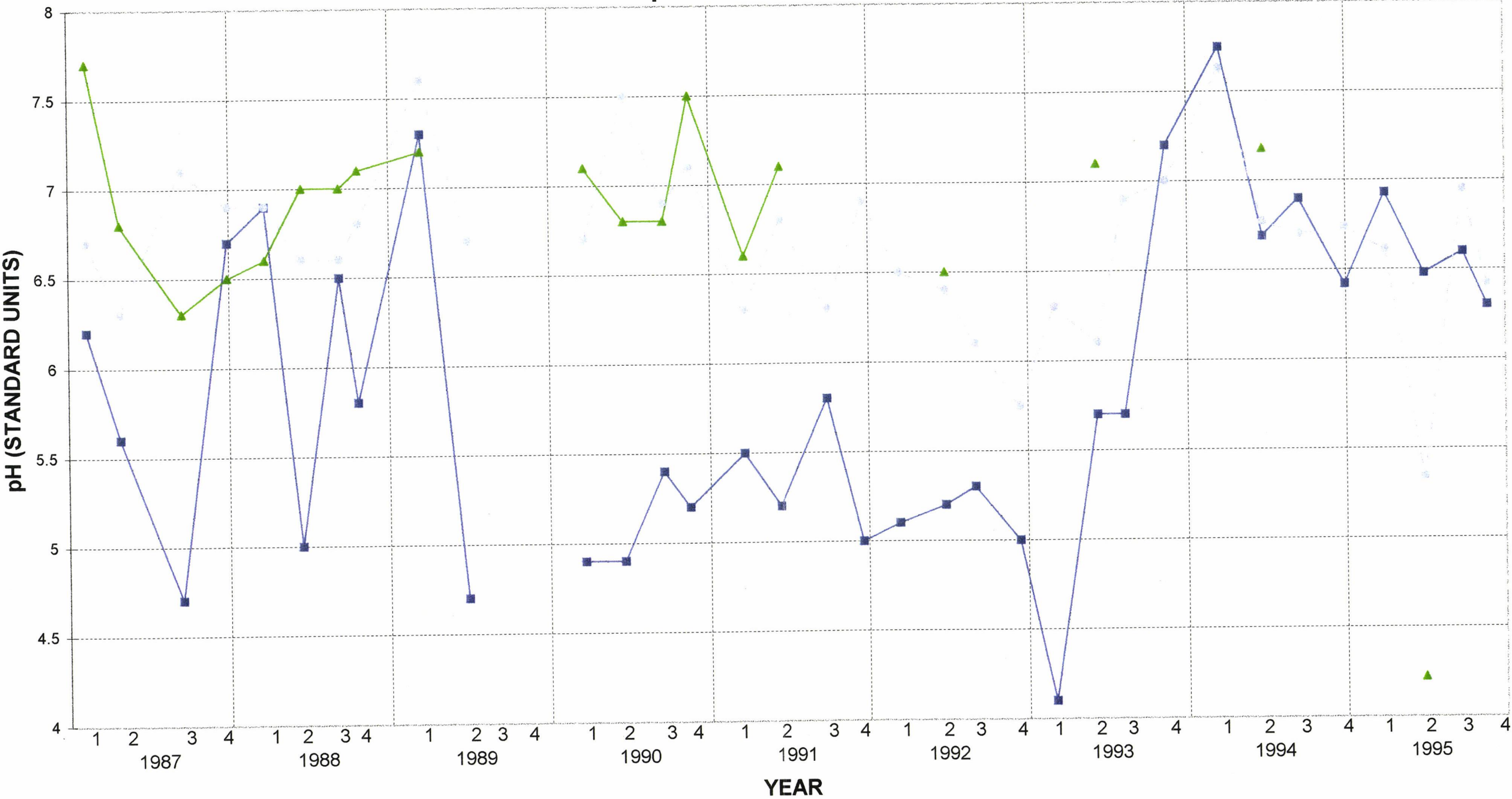
NICKEL CONCENTRATION - DEEP WELLS



NOTE: Prior to 3rd quarter 1991, metals analysis were dissolved concentrations.
Ground Water Protection Standard - 10 mg/l

INLAND REALTY - MARYVILLE, MISSOURI

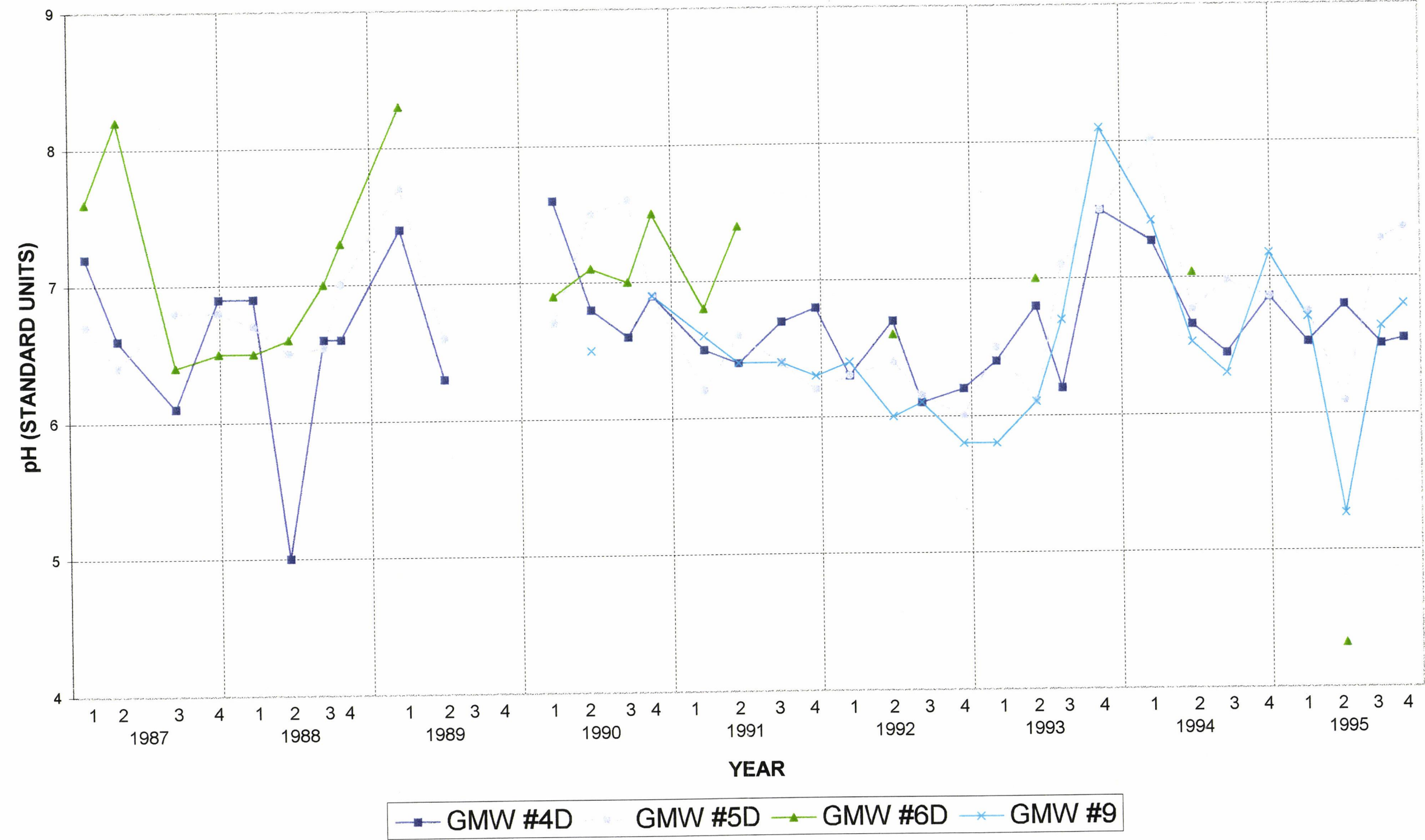
pH - SHALLOW WELLS



GMW #4S GMW #5S GMW #6S

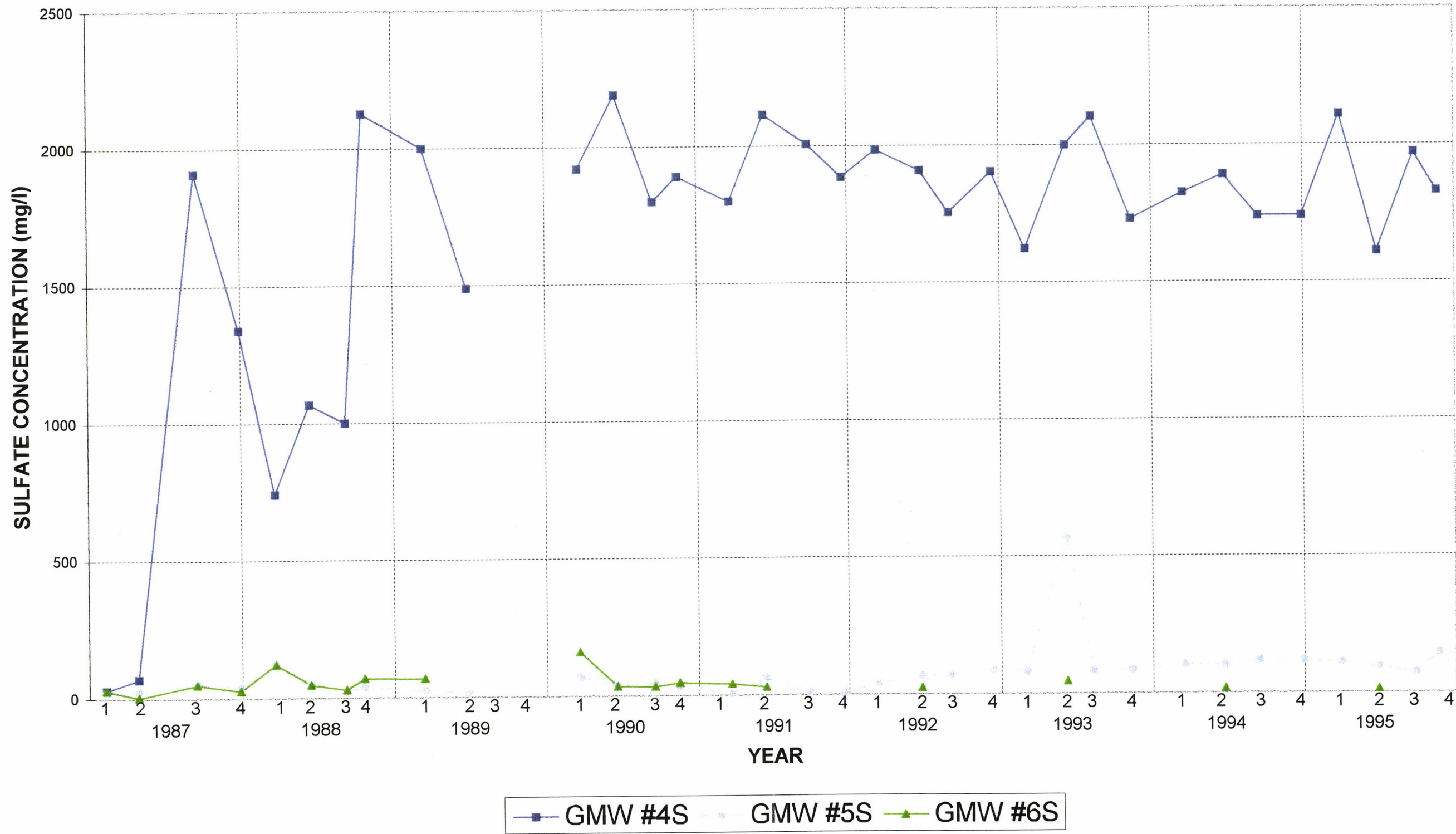
INLAND REALTY - MARYVILLE, MISSOURI

pH CONCENTRATION - DEEP WELLS



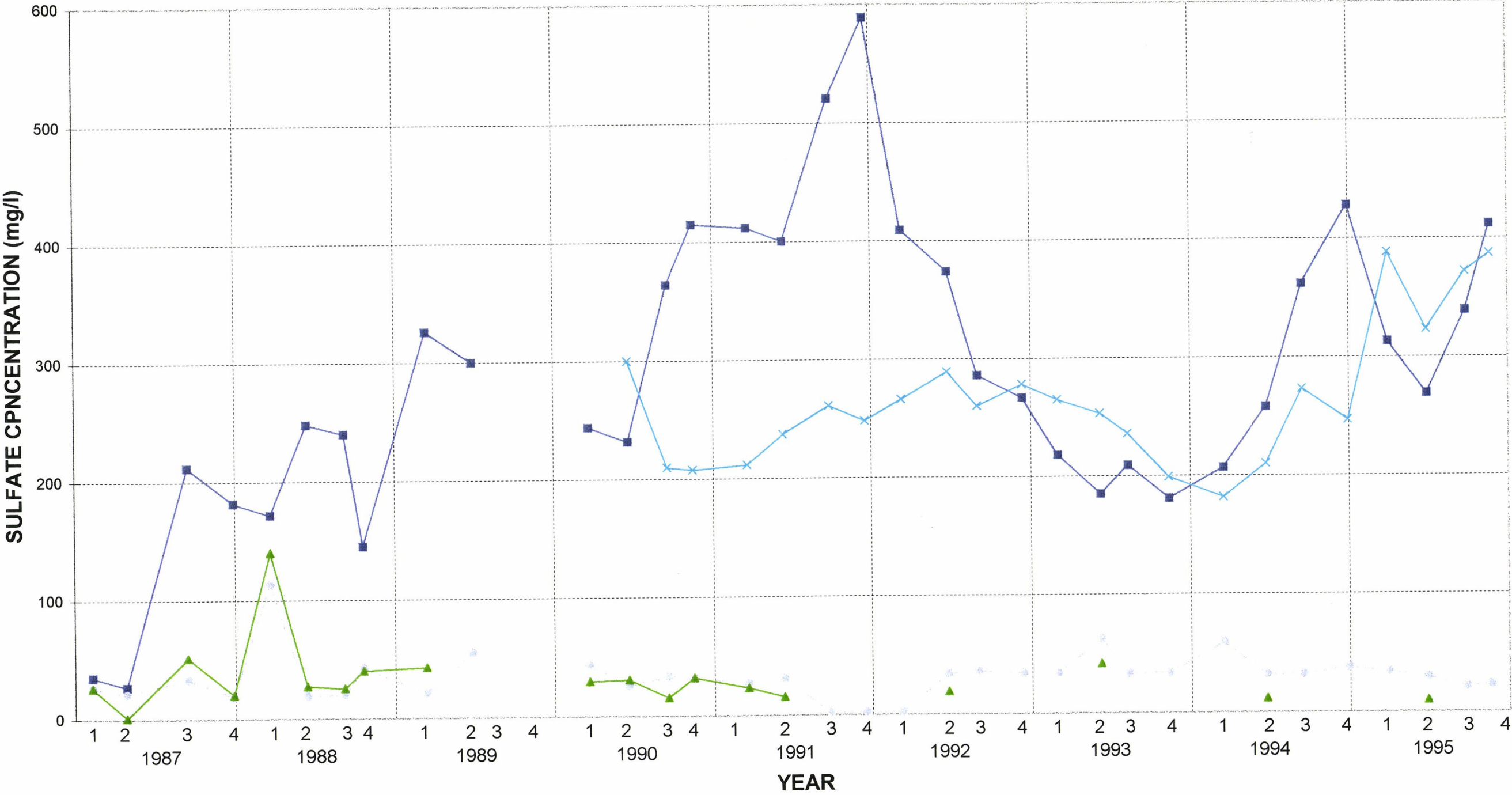
INLAND REALTY - MARYVILLE, MISSOURI

SULFATE CONCENTRATION - SHALLOW WELLS



INLAND REALTY - MARYVILLE, MISSOURI

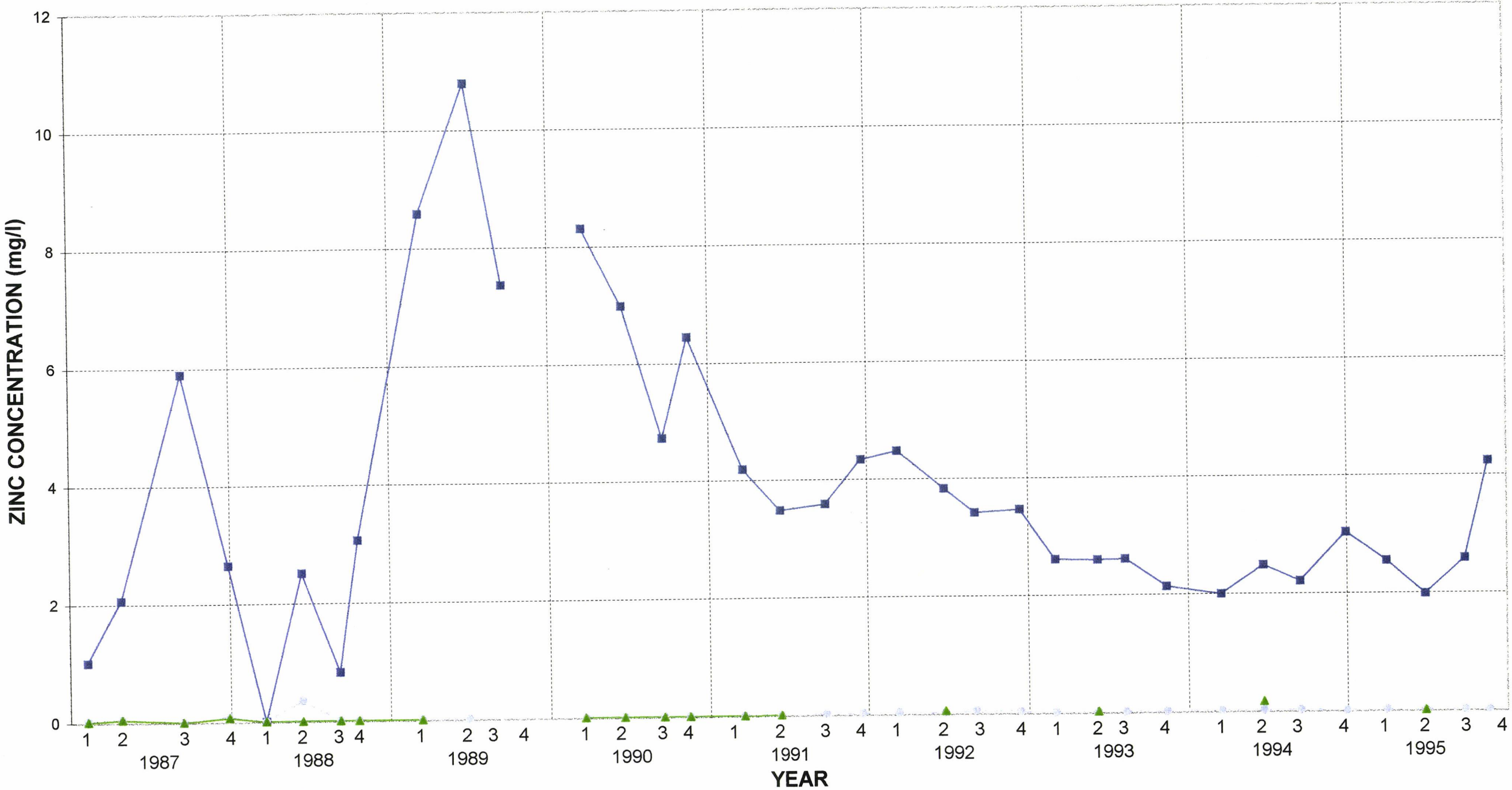
SULFATE CONCENTRATION - DEEP WELLS



—■— GMW #4D —●— GMW #5D —▲— GMW #6D —×— GMW #9

INLAND REALTY - MARYVILLE, MISSOURI

ZINC CONCENTRATION - SHALLOW WELLS

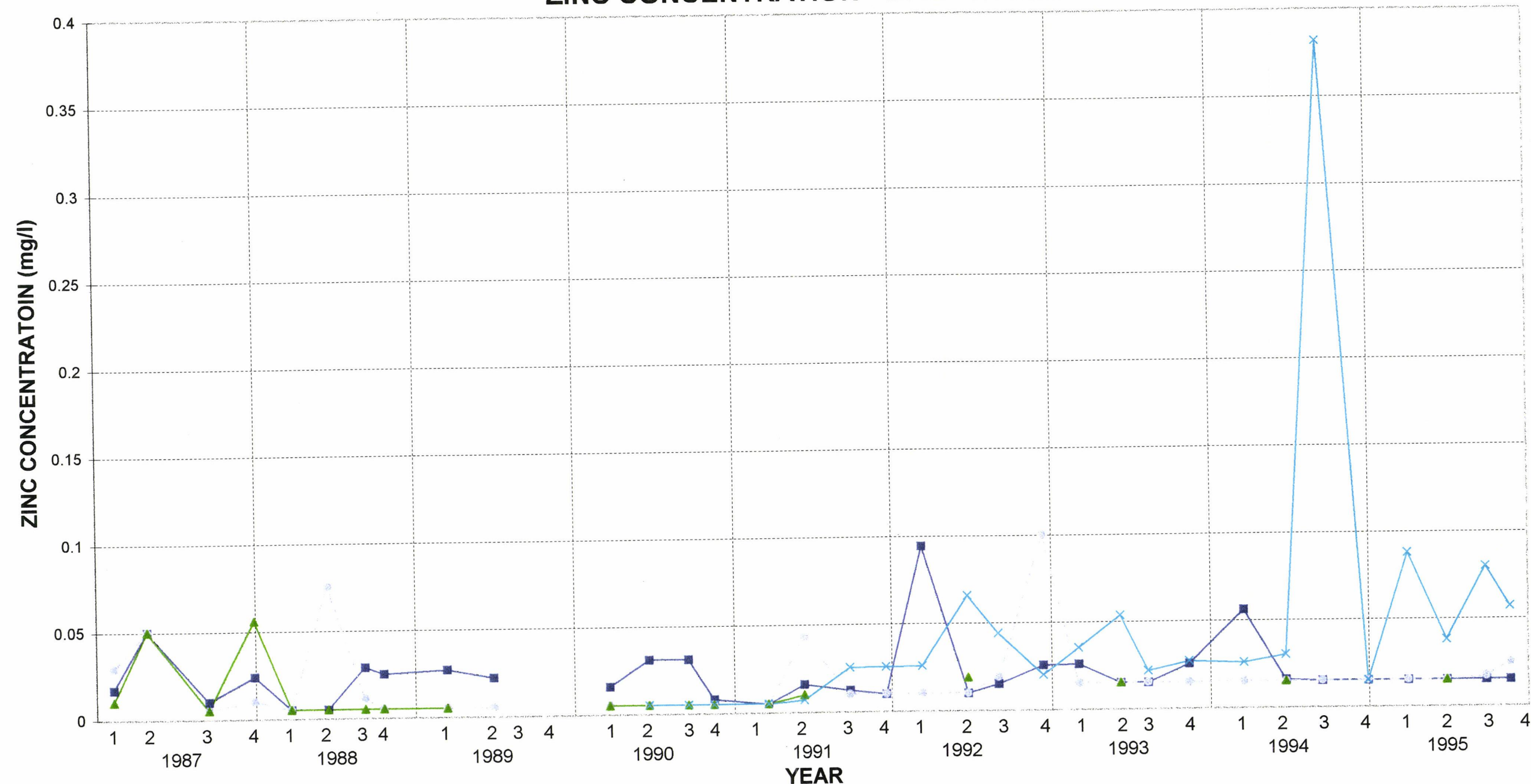


NOTE: Prior to 3rd quarter 1991, metals analysis were dissolved concentrations.
Ground Water Protection Standard - 1175 mg/l

GMW #4S GMW #5S GMW #6S

INLAND REALTY - MARYVILLE, MISSOURI

ZINC CONCENTRATION - DEEP WELLS



NOTE: Prior to 3rd quarter 1991, metals analysis were dissolved concentrations.
Ground Water Protection Standard - 1175 mg/l

GMW #4D GMW #5D GMW #6D GMW #9